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VALIDITY AND RELIABILITY ANALYSIS OF THE TEAMWORK PERCEPTIONS QUESTIONNAIRE IN THE TURKISH CONTEXT

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IN

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Ekip Çalışması Algıları Ölçeği'nin Türkiye Bağlamında Geçerlilik ve Güvenilirlik Analizi

ÖZET

Hasta güvenliği üzerine yapılan araştırmalar, çoğunlukla sağlık profesyonelleri arasındaki zayıf ekip çalışması ve etkisiz iletişimden kaynaklanan tıbbi hataların önde gelen ölüm nedenlerinden biri olduğunu göstermektedir. Çalışmalar, sağlık hizmetlerinin kalitesini artırmak amacıyla gerçekleştirilen ekip eğitim programlarının ekip performansını arttırdığına yönelik kanıt sağlamıştır. Sağlık Araştırma ve Kalite Ajansı Kurumu ve ABD Savunma Bakanlığı tarafından geliştirilen TeamSTEPPS® Performansı ve Hasta Güvenliğini Artırmak için Ekip Stratejileri ve Araçları programı, sağlık çalışanlarına eğitim vermeye yönelik tasarlanmış, yaygın olarak kabul edilen, kanıta dayalı ekip eğitim programlarından biridir. TeamSTEPPS programı kapsamında Ekip Çalışması Algıları Ölçeği, hem sağlık personelinin ekip çalışması algı düzeyini belirlemek hem de TeamSTEPPS ekip eğitim programının etkinliğini ölçmek için bir ölçme aracı olarak geliştirilmiştir.

Bu çalışmanın amacı, beş alt boyuttan ve toplam 35 maddeden oluşan TeamSTEPPS Ekip Çalışması Algıları Ölçeği'nin psikometrik özelliklerini Türkiye bağlamında test etmektir. Bu amaç doğrultusunda, ölçeğin herhangi bir metodolojik yanlılık oluşturulmadan Türkiye bağlamına uyarlanması amacıyla, literatürdeki çalışmaların önerdiği ölçek uyarlama prosedürü takip edilmiştir. Çalışmanın örneklemini Türkiye'deki iki farklı şehirde, toplam 4 farklı hastanede çalışan sağlık personeli (hekimler, hemşireler, ebeler, sağlık teknisyenleri, fizyoterapistler ve diyetisyenler) oluşturmaktadır. Ölçeğin geçerliliğini test etmek için keşfedici ve doğrulayıcı faktör analizleri yapılmıştır. Modelin güvenilirliği kompozit güvenilirlik katsayıları hesaplanarak incelenmiş, ayrıca tüm ölçeğin ve beş alt boyutunun ayrı ayrı iç tutarlılığını değerlendirmek amacıyla Cronbach alfa güvenilirlik katsayıları hesaplanmıştır. Yapılan analizlerin sonuçları, 29 maddeli Ekip Çalışması Algıları Ölçeği'nin Türkçe formunun güvenilir ve geçerli bir ölçme aracı olduğunu ortaya koymuştur.

Anahtar Sözcükler: TeamSTEPPS®, ekip çalışması, sağlık ekipleri, ölçek uyarlama

Validity and Reliability Analysis of the Teamwork Perceptions Questionnaire in the Turkish Context

ABSTRACT

Research on patient safety demonstrated that medical errors stemming mostly from poor teamwork and ineffective communication between health caregivers are one of the leading causes of death. Empirical studies provided evidence that team training programs can be useful to improve the quality of healthcare services. TeamSTEPPS® (Team Strategies and Tools to Enhance Performance and Patient Safety) designed by the Agency for Health Research and Quality and the U.S. Department of Defence is one of the widely accepted evidence-based team training programs. Within the TeamSTEPPS program, the Teamwork Perceptions Questionnaire was developed as a measurement tool both to examine the level of teamwork perceptions of healthcare personnel and to measure the effectiveness of the TeamSTEPPS team training program.

This thesis aimed to evaluate, in the Turkish context, the psychometric properties of the TeamSTEPPS Teamwork Perceptions Questionnaire, which had five subdimensions and a total of 35 items. In accordance with this purpose, the procedure proposed by the studies in the scale adaptation literature was followed to adapt the instrument without creating any methodological biases. Data were collected from 238 healthcare staff (i.e., physicians, nurses, midwives, health technicians, physiotherapists and dieticians) working in four hospitals located in two different cities in Turkey. Exploratory and Confirmatory Factor Analyses were performed in order to test the validity of the scale. The reliability of the model was assessed using composite reliability coefficients. In addition, Cronbach's alpha coefficients were calculated to assess the internal consistency of the entire scale and its five subdimensions. The results of the analyses revealed that the 29-item Turkish version of the TeamSTEPPS Teamwork Perceptions Questionnaire is a reliable and valid measurement tool for the assessment of healthcare professionals' perceptions toward teamwork.

Keywords: TeamSTEPPS®, teamwork, healthcare teams, scale adaptation

ABBREVIATIONS

AHRQ: Agency for Health Research and Quality

AMOS: Analysis of Moment Structures

AVE: Average Variance Extracted

CFI: Comparative Fit Index

CMIN: Minimum Value of Chi Square

CR: Composite Reliability

CRM: Crew Resource Management

DF: Degree of Freedom

DOD: The United States Department of Defence

ED: Emergency Department

EFA: Exploratory Factor Analysis

HSOPS: Hospital Survey on Patient Safety Culture

IOM: Institute of Medicine

ITC: International Test Commission

KMO: The Kaiser-Meyer-Olkin Sampling Adequacy Test

MLE: Maximum Likelihood Estimation

MTT: Medical Team Training

OB: Obstetrics

OR: Operating Room

PICU: Pediatric Intensive Care Unit

RMSEA: Root Mean Squared Error of Approximation

SPSS: Statistical Package for the Social Sciences

SRMR: Standardized Root Mean Square Residual

SICU: Surgical Intensive Care Unit

TEAMSTEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety

TLI: Tucker-Lewis Index

TPOT: Trauma Performance Observation Tool

TWQ: Teamwork Quality

T-TAQ: TeamSTEPPS Teamwork Attitudes Questionnaire

T-TPQ: TeamSTEPPS Teamwork Perceptions Questionnaire

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CHAPTER 1

1. INTRODUCTION

This chapter provides a brief overview of the thesis. The first part presents information on the study background and problem statement. The second part expresses the purpose of the current study. The third part explains the importance of the study. Lastly, the fourth part provides information regarding the structure of the thesis

1.1. BACKGROUND AND THE PROBLEM STATEMENT

In today's dynamic and uncertain business environments, organizations seek ways of developing new strategies and organizational structures in order to achieve complex and challenging tasks; and thus, accomplish organizational goals in a more efficient and effective manner. One of the ways that enable organizations to operate more efficiently and effectively is team-based structures (Salas, Sims, & Burke, 2005). The importance of teams has been widely recognized in many industries. According to the Deloitte's Global Human Capital Trends 2016 report, in which over 7,000 business executives from more than 130 countries were surveyed, one of the top priorities of organizations was organizational designs that allow them to become more flexible and customer-focused (Kaplan, Dollar, Melian, Van Durme, & Wong, 2016). In this context, teams have been considered one of the leading trends in the business world. This trend is expected to accelerate in the coming years as more organizations are increasingly adopt team-based organizational designs (Deloitte Global Human Capital Trends, 2020).

Team-based work structures are especially useful for organizations operating in high-risk industries, such as military, aviation, nuclear power plants, aerospace and healthcare since the operations in these industries are complex, require professionals with specialized knowledge and skills, and call for a high level of coordination, communication and collaboration among team members (Lacerenza Marlow, Tannenbaum, & Salas, 2018). Inter-professional communication and collaboration are

critically important in these industries because accidents or adverse events during the operations may lead to destructive consequences, such as airplane crashes in aviation, nuclear explosions or preventable mortality in healthcare.

In the context of healthcare, empirical studies demonstrated that medical errors and adverse events have been associated with ineffective teamwork and poor communication between team members (Manser, 2009; Pham et. al., 2012; Sheppard, Williams, & Klein, 2013). This fact was first highlighted by the report of the Institute of Medicine (IOM) 'To Err is Human', which contended that medical errors gave rise to nearly 98,000 deaths each year in the United States, and the primary causes of them were flawed communication and ineffective teamwork (Kohn, Corrigan, & Donaldson, 1999).

The seminal report of the IOM raised considerable awareness of medical errors in healthcare and promoted the patient safety movement to emerge. Various initiatives taken by agencies and governments to introduce quality standards for providing health care have gained momentum since the publication of IOM's report in 1999. For example, in 2002, the Joint Commission established a quality program 'National Patient Safety Goals' (NPSG) to guide healthcare organizations in specific domains with regard to patient safety. Since then, the commission releases new patient safety goals each and every year within the NPSG program to ameliorate the quality of the health care system (National Patient Safety Goals, n.d.).

TeamSTEPPS (Team Strategies And Tools To Enhance Performance And Patient Safety) framework introduced by the Agency for Health Research and Quality (AHRQ) in 2006 was one of the programs for improving the quality of healthcare services. It is an evidence-based team training program and aims for educating healthcare professionals to enhance their teamwork skills and competencies (Baker, Salas, Barach, Battles, & King, 2007).

Within the TeamSTEPPS program, the AHRQ developed several measurement tools for evaluating the effectiveness of the intervention (see Part 2.2.4.). The Teamwork Perceptions Questionnaire (T-TPQ) was one of the tools developed as a measurement instrument to examine the level of teamwork perceptions of healthcare personnel. The T-TPQ evaluates portrays teamwork as having five core competencies; namely, team structure, leadership, situation monitoring, mutual support, and communication.

Apart from measuring the level of teamwork perceptions of healthcare personnel, the T-TPQ can also be used to identify areas for improvement for team performance, devise training programs accordingly, and measure the effectiveness of the training programs. Empirical studies provided evidence that the implementation of the TeamSTEPPS team training interventions in general, and the T-TPQ in specific, improved team performance and patient outcomes (e.g., Mayer et al., 2011).

Tools and strategies provided by the Agency for Health Research and Quality within the TeamSTEPPS program have drawn the attention of researchers from different countries (Sheppard et. al., 2013), including Turkey. Bodur and Filiz (2010) translated the Hospital Survey on Patient Safety Culture (HSOPS) into Turkish. Yardımcı, Basbakkal, Beytut, Muslu and Ersun (2012) adapted the Teamwork Attitudes Questionnaire (T-TAQ) to the Turkish context. However, the psychometric properties of the Teamwork Perceptions Questionnaire (T-TPQ) have not been tested in the Turkish context. The current study is an attempt to address this gap in the literature.

1.2. PURPOSE OF THE STUDY

The objective of the current study is to test the validity and reliability of the Turkish version of the TeamSTEPSS Teamwork Perceptions Questionnaire (T-TPQ). In doing so, it was sought to propose an applicable, reliable and valid measurement tool for assessing the teamwork perceptions of Turkish healthcare professionals to be used by healthcare institutions and scientists working in this domain.

1.3. SIGNIFICANCE OF THE STUDY

The contributions of this study are fourfold. First, the review of the literature suggested that there is a lack of a measurement tool for assessing teamwork perceptions of health staff in the Turkish context. Therefore, this study is expected to contribute to the existing body of knowledge on healthcare studies in Turkey by proposing a valid and reliable instrument for measuring the perceptions of healthcare workers toward teamwork. Second, considering the fact that the T-TPQ was translated into different

languages and adapted to several contexts (Ballangrud, Husebø, & Hall-Lord, 2017; Hall-Lord, Skoogh, Ballangrud, Nordin, & Bååth, 2020; Lakatamitou, Lambrinou, Kyriakou, Paikousis, & Middleton, 2020), the translation of the T-TPQ into Turkish was hoped to enhance the generalizability of the scale and promote the research attempts for cross-cultural comparison. Third, existing studies conducted in the Turkish population mainly focused on the attitudes of the healthcare personnel regarding teamwork (e.g., Çelik et al., 2019; Uslu-Sahan & Terzioğlu, 2020). However, as suggested by the AHRQ (King et al., 2008), the teamwork performance should be measured by taking both attitudes and perceptions of health caregivers into account. Therefore, the current study is hoped to allow researchers to carry out more comprehensive empirical studies regarding teamwork in healthcare. Lastly, for practitioners, the Turkish version of the T-TPQ can be used to measure team performance of a unit or to determine whether a team training intervention is needed and effective.

1.4. THE STRUCTURE OF THE THESIS

The current study proceeds as follows. Chapter 2 reviews the literature on teamwork and team training, as well as medical errors that threaten patient safety. Chapter 3 explains the research method followed. It describes the population and sample, presents data collecting procedure and the measurement tools, elaborates the scale adaptation procedure and gives information about statistical analyses employed in this thesis. Chapter 4 presents the results of the statistical analyses carried out in this study. Chapter 5 discusses the implications of the study and concludes the study with final remarks.

CHAPTER 2

2. REVIEW OF THE LITERATURE

This chapter is devoted to reviewing the existing literature and consists of two main parts. The first part highlights the importance of teamwork in general and the second part relates to patient safety.

2.1. TEAMWORK

The first part of this chapter is divided into three sections. The first section defines the concept of teamwork and describes its importance. The second section provides information on the taxonomy of teams. The third section presents the components of effective teamwork.

2.1.1. Defining Teamwork

In describing teamwork, it is needed to first define the concept of team. The dictionary definition of the word "team" is "a group of people who work together on a particular activity" (Cambridge Dictionary, n.d.). Dyer (1984) defines teams as social entities comprised of individuals with shared values and common goals. According to Brannick & Prince (1997), a team refers to two or more individuals with different skills and knowledge coming together to achieve organizational purposes. Salas, Dickinson, Converse, & Tannenbaum (1992) describes teams as "a distinguishable set of two or more people who interact dynamically, interdependently, and adaptively towards a common and valued goal/objective/mission" (p. 4). These conceptualizations indicate that teams should possess certain characteristics (Cohen & Bailey, 1997; Headrick, Wilcock, & Batalden, 1998; Mohrman, Cohen, & Mohrman Jr, 1995; Pritchard, 1995; Reeves, Lewin, Espin, & Zwarenstein, 2011; Sundstrom, DeMeuse, & Futrell, 1990). These characteristics are below:

- Teams consist of individuals embracing an identity as a ‘team member’.
- Teams are composed of individuals sharing common goals.
- Teams work under a collective agreement describing how team members can work together.
- Teams are made up of individuals performing specific functions and having distinct roles.
- Teams consist of members sharing the responsibility for team success.
- Teams have clear lines of authority and accountability.

Teamwork refers to a dynamic process involving multiple individuals with specific skills, knowledge and competencies to accomplish shared organizational goals by working closely and interdependently (Salas Cooke, & Rosen, 2008; West, 2012; Xyrichis & Ream, 2008). In today's swiftly changing environments, organizations are more dependent on teams to accomplish complex and difficult tasks (Salas, Rico, & Passmore, 2017). Teams allow organizations to operate more efficiently and effectively (Tambe, 1997). Teams are particularly important for organizations operating in high-risk industries, such as aviation, military, nuclear power plants, and health care where errors can result in disastrous consequences (Baker, Day, & Salas, 2006). Teams are more promising than any individual in terms of capacity to create innovative solutions to problems and are more capable of completing complex and difficult work activities (Sundstrom et al., 1990). Organizations increasingly opt for a team-based structure to the extent that they have to cope with challenging operations in unstable environments.

Teams’ effectiveness hinges upon the execution of both taskwork and teamwork (Salas et al., 2015). Taskwork refers to the work activities that should be carried out by team members to achieve organizational purposes (Wildman et al., 2012). Teamwork is, on the other hand, more related to attitudes, behaviors and cognitions shared by team members that are needed to complete these work activities (Morgan, Salas, & Glickman, 1994). Teamwork facilitates communication and coordination among team members, and thus assists for completing taskwork. Therefore, teams should engage in both taskwork and teamwork to achieve organizational purposes in an efficient and effective way (Salas, Shuffler, Thayer, Bedwell, & Lazzara, 2015).

There are various types of teams and various core elements that make teams function effectively and valuable for organizations. The following two parts briefly review the literature on the taxonomy of teams and components of teamwork.

2.1.2. Taxonomy of Teams

Although teams are defined as a group of individuals with various expertise assembled to achieve a common purpose, it is important to note that they are not identical and are not created for the same purposes (Salas, Burke, & Cannon-Bowers, 2000). Research on teamwork has proposed several taxonomies of teams (e.g., Cohen & Bailey, 1997; De Dreu & Weingart, 2003; Denison, Hart, & Kahn, 1996; Pinto, Pinto, & Prescott, 1993; Sundstrom et al., 1990; Sundstrom, 1999). For example, Sundstrom et al. (2000) identified six kinds of working groups based on earlier studies: production groups (i.e., teams involving front line employes producing tangible outputs), service groups (i.e., teams consisting of front line employees making transactions and keeping in touch with customers), management teams (i.e., teams consisting of executives who develop long-term plans and strategies), project groups (i.e., teams consisting of individuals with specific expertise and from different departments coming together to achieve a specific task) and advisory groups (i.e., consultants). Several additional types of teams were defined in the literature such as parallel teams (Cohen & Bailey, 1997), decision-making teams (De Dreu & Weingart, 2003), cross-functional teams (Denison, Hart, & Kahn, 1996), new product development teams (Ancona & Caldwell, 1992), top management teams (Lin & Shih, 2008).

Hollenbeck, Beersma and Schouten (2012) reviewed the literature on team taxonomy and identified 42 different types of teams. The authors argued that such a big number revealed an inconsistency on the classification of teams. However, they also contended that there is a decent consensus on the underlying constructs that differentiate teams. According to the authors, teams differ from one another on the basis of three dimensions: skill differentiation, authority differentiation and temporal stability (see Figure 2.1.). Skill differentiation is associated with the degree of team members' specific skills and knowledge that can create challenges for member substitution. Authority differentiation is related to the degree of members' responsibility for decision-making. Temporal stability refers to the degree to which team members have an experience of

working together and have an expectation to work in the future. Teams can be distinguished based on these dimensions, however, effective teamwork requires certain elements that should be possessed by any kinds of teams. The following part describes the critical components of effective teamwork.

Figure 2.1. Dimensional Scaling Framework for Describing Teams (Hollenbeck et al., 2012)

2.1.3. Components of Teamwork

Considering the fact that teamwork is a topic of interest for researchers working in various disciplines, great efforts have been made to develop theoretical models (Salas, Cooke, & Rosen, 2008). For example, Hoegl and Gemuenden (2001) developed a

conceptual model called “Teamwork Quality” (TWQ). The model consists of six core elements of effective teamwork: communication, coordination, balance of member contributions, mutual support, effort, and cohesion. Hoegl and Gemuenden (2001) asserted that these six teamwork components are significantly associated with both team effectiveness and individual success of team members.

Another teamwork model was proposed by Dickinson and McIntyre (1997). Their model involves seven core components of teamwork: communication, team orientation, team leadership, monitoring, feedback, backup and coordination. The authors clarified associations among teamwork variables and emphasized communication as the most important element of effective teamwork.

Based on a comprehensive literature review, Salas et al. (2005) proposed the “Big Five” model to describe the core components of effective teamwork (see Figure 2.2.).

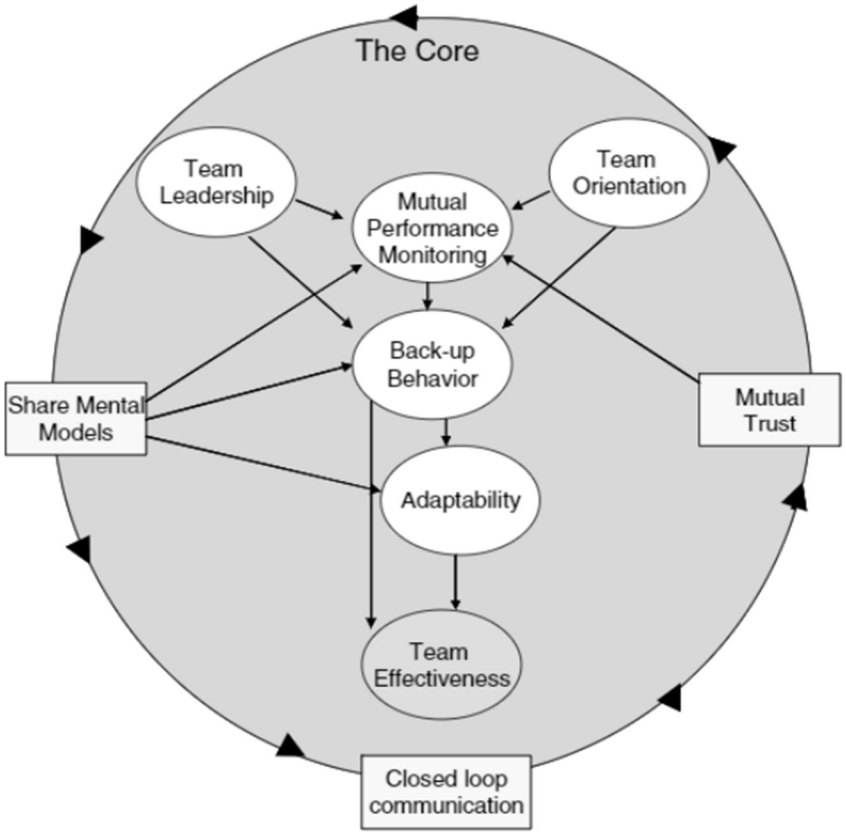

Figure 2.2. The “Big Five” Framework (Salas et al., 2005)

This teamwork model is one of the most cited frameworks in team literature. It also constitutes the theoretical background for the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ), which was adapted to the Turkish context in this thesis. In their framework, Salas et al. (2005) identified five dimensions of effective teamwork: leadership, mutual performance monitoring, backup behavior, adaptability and team orientation. These five core elements are supported by three coordinating mechanisms that facilitate teamwork processes: mutual trust (i.e., the shared belief of team members that individuals will respect and protect each other's rights and will engage in the common interest; Webber, 2002), closed-loop communication (i.e., the exchange of relevant information among team members; McIntyre & Salas, 1995) and shared mental models (i.e., an organizing knowledge that allows team members to understand, describe and anticipate each other's behaviors and thus improves coordination processes and performance; Dinh & Salas, 2017; Klimoski & Mohammed, 1994). The association among these eight variables in the creation of effective teamwork is presented in Figure 2.2. (Salas et al., 2005). The five core elements in Figure 2.2. are briefly reviewed below.

2.1.3.1. Team Leadership

The first component of effective teamwork in Salas et al.'s (2005) framework is leadership. Team leadership emerges as one of the principal elements of effective teamwork due to its following functions (Baker et al., 2006; Salas et al., 2005; Zaccaro, Rittman, & Marks, 2001):

- Effective teamwork requires team leaders to direct and coordinate the work activities carried out by subordinates.
- Team leaders are responsible for assessing team performance in a way that is based on the assessment of goals priorly declared to team members.
- Team leaders assign tasks to team members in a way that promotes collaborative teamwork and to ensure that the tasks are completed as effectively as possible.
- Team leaders also have a responsibility to develop specific team knowledge, skills and attitudes based on the requirements for accomplishing team goals.
- Team members endeavours to motivate subordinates toward organizational purposes and to create a positive team climate as it facilitates achieving goals.

The importance of team leaders for teams has been well-documented in the literature. Salas et al. (2000), for example, argued that team leaders are able to facilitate team effectiveness by establishing teams' shared mental models that enable team members to understand team goals accurately. Reader, Flin, Mearns, & Cuthbertson (2007) found that team leaders who create an atmosphere in which team members feel comfortable with sharing information and participating decisions positively affected the working environment and thus the quality of patient care. Zaccaro et. al. (2001) suggested that team leaders improve team performance through performance monitoring and backup behavior as they have a responsibility for scanning the external and internal environment and warning subordinates to ensure that team members work in a coordinated and goal-directed manner.

2.1.3.2. Mutual Performance Monitoring

Salas et al. (2005) proposed mutual performance monitoring (i.e., situation monitoring) as the second component of the "Big Five". Mutual performance monitoring is defined as the monitoring behavior of team members to make sure that unexpected situations do not occur and other team members work in a way that follows the procedures (McIntyre & Salas, 1995). The importance of this component relies on the fact that it allows team members to detect each other's mistakes and enables to share feedback among team members (Baker et al., 2006). Mutual performance monitoring behavior is also associated with backup behavior, the third component of the Big-Five because when team members identify each other's errors, they are expected to support one another so that job's work activities can be conducted properly. According to Salas and his colleagues, mutual performance monitoring behavior's desired effect for effective teamwork only occurs in a work setting in which team members trust each other and have a shared mental model (McIntyre & Salas, 1995; Salas et al., 2005). Therefore, Salas et al. (2005) proposed that the dimension of mutual performance monitoring have an impact on team effectiveness through effective backup behavior and is associated with adequate shared mental models and a climate of trust.

2.1.3.3. Back-up Behavior

The third core element of the Big-Five model proposed for effective teamwork is backup behavior. Porter et al. (2003) describe backup behavior as “the discretionary provision of resources and task-related effort to another member of one’s team” (p. 391). Team members’ backup behavior emerges when team members recognize that another team member suffers from a heavy workload and will unable to complete the task. Marks Mathieu and Zaccaro (2001) define three types of backup behaviors: to share feedback to improve team performance, to help other team members during performing a task and to complete the teammates' job in times of overloading. Through these mechanisms, backup behavior enables teams to finish tasks more effectively as it helps teams to be more flexible.

In their Big-Five framework, Salas et al. (2005) associate backup behaviour with team adaptability, shared mental models and mutual performance monitoring. The authors stated that, just as the linkage between mutual performance monitoring behaviors and shared mental models, backup behaviors requires the adequate shared mental models as it requires team members for anticipating each other’s needs. Also, they proposed that the impact of team members’ backup behaviors on team effectiveness is much higher in teams with higher ability to adapt to external and internal circumstances since teams’ ability to adapt to changes enables teams to develop strategies to compensate team members’ imperfections.

2.1.3.4. Adaptability

The fourth component ,adaptability, is regarded as a team process that allows teams to achieve organizational purposes more efficiently. Priest, Burke, Munim and Salas (2002) defines the concept of team adaptability as one of the teamwork components that enable teams to readjust strategies and actions performed according to the information acquired from the environment. As it was discussed in relation to mutual performance monitoring behaviors and backup behaviors, team members should be aware of variances in situations that require additional information or assistance to adapt their positions to unexpected circumstances. Research has found that teams with more adaptable members were more effective than those whose members were less adaptable

or inflexible (Campion, Medsker, & Higgs, 1993). Therefore, Salas et al. (2005) proposed team adaptability as one of the core components of effective teamwork.

2.1.3.5. Team Orientation

Team orientation is the last component of the "Big Five". The literature on teams defines team orientation as the degree of willingness of team members to be part of a team or the attitude of team members to prioritize team goals over his or her individual interest (Driskell & Salas, 1992; Mohammed & Angel, 2004). Research on teamwork demonstrated that team orientation increased teamwork effectiveness through improved task involvement and information sharing behaviors of team members (Driskell & Salas, 1992). Ramamoorthy et al. (2007) found that team-oriented employees were more willing to pay extra effort and had a higher degree of normative and affective commitment than those with individual-oriented. Eby and Dobbins (1997) provided evidence that team orientation was a contributing factor to team coordination among team members. Salas et al. (2005) argued that since members with team orientation are motivated by team goals and strive more for team success, they are more likely to show mutual performance monitoring behaviors and backup behaviours. Therefore, they proposed that team orientation increases team effectiveness through mutual performance monitoring and backup behaviors.

The purpose of this thesis was to adapt the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ), which was developed to measure perceptions of health staff toward teamwork, to the Turkish context. In accordance with this purpose, the first part of the literature review of this thesis aimed to present the existing body of knowledge on teamwork in general. The following part aims to explain the importance of teamwork in healthcare.

2.2. TEAMWORK AND PATIENT SAFETY

The second part of this chapter is divided into four sections. The first section briefly describes the history and evolution of the patient safety movement. The second section discusses the significance of teamwork in the delivery of healthcare services. The

third section provides knowledge regarding the TeamSTEPPS team training program. Lastly, the fourth section reviews the measurement of teamwork in the context of healthcare.

2.2.1. Brief History And Evolution of Patient Safety

Patient safety refers to “the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the processes of health care” (Cooper et al., 2000, p.2). World Health Organization (2005) defines the concept of patient safety as the delivery of medical care with avoiding accidental injuries caused by medical errors. The famous phrase 'First, do no harm', which was derived from the earlier Hippocratic wordings (Vincent, 2010), reveals that patient safety and medical error are not recent phenomena in healthcare. Table 2.1. shows important publications and events in the evolution of patient safety movement.

As can be observed from Table 2.1., earlier studies, which emerged in the middle of the 19th century, were concerned with medical error and patient harm. Ignaz Semmelweis, known as “the father of infection control”, published his findings in the late 1850s. He observed that the rate of post-delivery mortality among women who were transferred into rooms by physicians was much higher rather than those transferred by midwives. He explained this finding with the argument that physicians’ hands were much contaminated due to the operation and that caused puerperal infections (Best & Neuhauser, 2004; Carter, 1985). In her seminal book “Notes on Hospitals” (1863), Florence Nightingale accentuated the importance of care for the patient without harm as a central principle in a hospital. At the beginning of the 20th century, Ernest Codman proposed the “end-result system” as the first systematic approach to examining the causes of medical errors and adverse events (Sharpe & Faden, 1998). In the 1950s, David Barr and Robert Moser drew attention to another hazard to patient safety, iatrogenic diseases. Barr (1956) pointed out the excessive use of drugs, such as antibiotics and penicillin, caused adverse events and patient harm. Moser (1959) described iatrogenic diseases as “diseases of medical progress” and argued that iatrogenic harm is preventable (Vincent, 2010; Sharpe & Faden, 1998). Although such examples demonstrate that medical error has been an issue for more than a century, the emergence of patient safety as a discipline is relatively recent.

Table 2.1. Milestones in the Patient Safety Movement (Reproduced from Wachter, 2008)

Year	Author/Agency	Publication/Event	Implication/Contribution
1857	Ignaz Semmelweis	Etiology, Concept and Prophylaxis of Childbed Fever	Hand disinfection reduces the occurrence of puerperal fever.
1863	Florence Nightingale	Notes on Hospitals	There is a need to remind that the very first principle of hospitals should be 'do no harm'.
1911	Ernest Codman	'End Result' hospitals	Surgeon Ernest Codman argued for following each patient at least one year to observe errors in treatment and established his own hospitals called "End Result" to learn from patient outcomes.
1959	Robert Moser	Diseases of Medical Progress	Iatrogenic diseases are medical errors and preventable.
1964	Elihu Schimmel	The hazards of hospitalizations	Except for medical errors, 20% of hospitalized patients suffered from iatrogenic illnesses.
1977	Ivan Illich	Limits to Medicine: Medical Nemesis, the Expropriation of Health	Healthcare creates threats for patients. Medication causes patient harm rather than treatment. The best solution for patients is to avoid medical intervenes as much as possible.
1991	Brennan et al., 1991; Leape et al., 1991	Harvard Medical Practice Studies	In hospitalizations, 3.7 percent of patients experienced adverse events that caused disabilities and deaths.
1994	Lucian Leape	Error in Medicine	Errors might arise from 'human factor', however, the latent factor that allows health personnel to err is flawed health systems that are doomed to fail eventually.
1999	The Institute of Medicine	To Err is Human	In the United States, medical errors cause up to 98,000 deaths annually.
2000	The U.K. National Health Service	An Organisation with a Memory	Adverse events, estimated to be around 850,000 annually in the U.K., can be prevented with systems thinking, learning from other high-risk industries such as aviation.

Patient safety has become a discipline in the healthcare domain in the 1990s with the publication of Harvard Medical Practise studies (Brennan et al., 1991; Leape et al., 1991). The findings of these studies revealed that around 4% of hospitalized patients suffered from various adverse events, and almost one in three of these events occurred

due to negligence, which resulted in temporary or permanent disabilities (73.1 percent) and even death (13.6 percent) (Brennan et al., 1991). Another finding was that drug complications, wound infections and technical complications were the most common types of adverse events that occurred in hospitals (Leape et al., 1991). Considering the fact that errors stemming from medical management, which were attributed to negligence, the authors pointed out the human factor in medical errors and adverse events were preventable (Brennan et al., 1991; Leape et al., 1991). These findings were later highlighted by the Institute of Medicine (IOM) in its seminal report 'To Err is Human' in 1999.

The report of the IOM (1999) initiated a new era in patient safety research. In light of the findings of earlier studies and the analyses of data acquired from hospitals, the report stated that preventable adverse events were the leading cause of death and that between 44,000 and 98,000 people die in the USA annually due to medical errors (Kohn, Corrigan, & Donaldson, 1999). The report raised massive public awareness of patient safety and triggered the governmental efforts to improve patient safety. The report also made patient safety the topic of interest for researchers and led the number of studies that focus on medical errors jeopardizing patient safety to increase considerably (Stelfox, Palmisani, Scurlock, Orav, & Bates, 2006). In the patient safety literature, the IOM report is considered the beginning of the modern era in patient care.

2.2.2. Teamwork in the Healthcare Context

After the publication of the IOM report, patient safety research has focused on medical errors that occurred in the delivery of health care. Numerous studies have been carried out to identify the contributing factors of medical errors and to detect the deficiencies in health care systems (e.g. Barker, Flynn, Pepper, Bates, & Mikeal, 2002; Guly, 2001). These studies have identified various types of medical errors. For example, Guly (2001) examined the underlying causes of diagnostic errors in the accident and emergency department and found that the failure of misreading radiographs was the primary cause of errors. Barker et al. (2002) investigated the prevalence of medication errors in the hospitals accredited by the Joint Commission on Accreditation of Healthcare Organizations. Even though these hospitals were accredited and thus were expected to

Table 2.2. Definitions of Medical Errors (Source: Author's own compilation)

Error term	Definition
Error	"the failure of a planned action to be completed as intended (i.e. error of execution) or the use of a wrong plan to achieve an aim (i.e. error of planning)" (Kohn, Corrigan, & Donaldson, 1999, p.4)
Active error	an error that occurs during the interaction with the patient, mostly involving the acts of the front-line healthcare workers such as physicians, nurses, technicians and so on (Wachter, 2008). For example, operating on the wrong limb or mislabelling of blood tubes.
Latent error	an error associated with the health system deficiencies such as poor organizational design, weak management systems, ineffective training programs, maintenance flaws and so forth (Sanchez & Barach, 2017).
Medication error	an error stemming from the prescription of inappropriate drugs or giving wrong doses of drugs (Wachter, 2008).
Surgical error	an error that occurs in the operating room during surgery (Rogers et al., 2006)
Diagnostic error	an error associated with the wrong recognition of disease (Ely, Graber, & Croskerry, 2011).
Transition and handoff error	an error that occurs during which a patient is transferred from one location to another location, from one health unit to another unit or from one health personnel to another (Forster et al., 2003).
Communication error	an error that arises from poor teamwork between multidisciplinary staff, ineffective leadership or lack of support, which result in missing, wrong or incomplete information (Vincent, 2010).
Nosocomial infections	hospital-acquired infections that harm patients under medical care (Weinstein et al., 2005). Wachter (2008) considers nosocomial infections medical errors due to the fact that the literature on patient safety demonstrated that risks for such infections can be reduced with the help of safety culture practices and training (e.g., Berenholtz et al., 2004)

satisfy several safety standards, the study reported that medication errors were widespread and nearly one of five doses given to patients were erroneous. Table 2.2. presents the definitions of different types of medical errors identified by studies conducted after the publication of IOMs' report in 1999.

Research on patient safety and medical errors has demonstrated that a substantial proportion of medical errors and adverse events are caused by poor teamwork and lack of communication among team members (Greenberg et al., 2007; Leonard, Graham, & Bonacum, 2004; Starmer et al., 2014; Sutcliffe, Lewton, & Rosenthal, 2004). In their recent article, for example, Lark, Kirkpatrick and Chung (2018) examined the history of patient safety to shed light on the future research directions for the domain. The authors pointed to the importance of teamwork and proposed that health care agencies should

develop strategies at the system (or organizational) level and prioritize the enhancements of non-technical skills, such as teamwork, communication and responsibility, to establish a safer healthcare system.

In the health context, teamwork refers to the interaction and cooperation of health caregivers in the process of providing safe and effective patient care (Oandasan, Baker, & Barker, 2006). Effective teamwork in health care is based upon the working environment where the team culture promotes participative leadership, high levels of collaboration and communication among team members. In the operating room, ineffective teamwork and poor communication have been identified as two major factors resulting in medical errors. For example, Lingard et al. (2004) investigated the impact of communication failures in the operating room. They detected 129 communication failures out of 421 communication events. Failure types were poor timing (45.7%), missing or inaccurate information (35.7%), unsolved issues (24.0%) and excluding key individuals (20.9%). The authors noted that 36.4% of communication failures gave rise to visible outcomes, such as delay, team tension, workaround, resource waste, patient inconvenience and procedural errors. Wiegmann, ElBardissi, Dearani, Daly and Sundt (2007) investigated the impact of surgical flow disruptions on surgical errors. They found that the frequency of surgical disruptions was positively associated with the number of surgical errors. Among many factors, such as resource unavailability, equipment and technology problems and training-related issues, teamwork and communication failures were the strongest cause of surgical errors. Mazzocco et al. (2009) examined the role of team behaviors of surgical teams on patient outcomes. They found that poor performance on teamwork evaluation measures, such as sharing information, briefing others during handoffs, situation monitoring, and asking for input, were significantly associated with severe complications or death.

Teamwork and communication have also been found critical for the efficiency of patient care. Catchpole, Mishra, Handa, & McCulloch (2008) analyzed the impact of teamwork skills (i.e., leadership and management; teamwork and cooperation; problem-solving and decision making; and situation awareness) on technical outcome parameters (i.e., operating time; errors in surgical technique; other procedural problems and errors). The authors provided evidence that the process of teamwork and communication significantly predicted the efficiency of operations. Källberg et al. (2015) investigated the

contributing factors of medical errors in the emergency department and found that medical errors might arise from multiple sources, but the most common factors were related to human error and teamwork failure. This finding suggests team competencies and communication skills of health staff are vital for health care teams in the emergency departments where the environment is highly dynamic and complex and the unexpected workload can be massive from time to time.

To sum up, research on patient safety demonstrates that poor teamwork and lack of communication among team members are among the major threats to patient safety (Hull et al., 2012). Furthermore, the literature presents the significance of teamwork in all settings, such as operating room, emergency department, and intensive care unit. The literature also pointed out that, to provide safer health care for patients, team training programs for the improvement of teamwork skills of health caregivers are needed. The following part presents the existing knowledge on team training, the TeamSTEPPS team training intervention in particular.

2.2.3. The TeamSTEPPS® (Team Strategies And Tools To Enhance Performance And Patient Safety)

Over the last twenty years, with the recognition of the role of teamwork on patient safety, authorities and institutions gave weight to the development of team training programs to improve teamwork skills of healthcare givers. Patient safety research has learned a lot from teamwork literature and the examples of team training programs implemented in different industries, such as aviation and military.

Crew Resource Management (CRM) is one of the examples that has been widely implemented in aviation, military, healthcare and other high-risk sectors. CRM curriculum was first applied to the aviation industry, concentrating on the development of crew members' teamwork skills, such as interpersonal communication, workload management, leadership, decision making and situational awareness (Helmreich, Merritt, & Wilhelm, 1999; Salas et al., 2015). Research investigating the impact of CRM intervention demonstrated that the program generates positive outcomes regarding flight attendants' attitudes and behaviors, such as risk identification, assertive communication, and feedback sharing (Clapper & Kong, 2012; O'Connor et al., 2008). CRM training has

also been found an effective team training intervention in several healthcare settings, such as surgery (e.g., Tapson, Karcher, & Weeks, 2011), cardiac surgery (e.g., Stevens et al., 2012), critical care unit (e.g., Frengley et al., 2011), trauma (Steinemann et al., 2000), and pediatric resuscitation (Van Schaik, Plant, Diane, Tsang, & O'Sullivan, 2011).

Veterans Health Administration Medical Team Training (MTT) is another team training program implemented to enhance team performance in healthcare settings. The implementation of MTT has been found to be associated with decreased surgical morbidity (Young-Xu et al., 2011) and improved teamwork climate (Carney, West, Neily, Mills, & Bagian, 2011). More examples of team training interventions can be seen in systematic literature reviews (e.g., Buljac-Samardzic, Dekker-van Doorn, Van Wijngaarden, & Van Wijk, 2010; Weaver et al., 2010).

Still, another team training program developed for healthcare settings is TeamSTEPPS (Team Strategies And Tools To Enhance Performance And Patient Safety) intervention. TeamSTEPPS was born with a government initiative after the publication of IOM's seminal report in 1999. In 2002, the Agency for Health Research and Quality (AHRQ) was funded by the U.S. Congress to commence an aggressive research and training program to improve the quality of the U.S. health system (Wachter, 2008). In 2006, AHRQ launched the TeamSTEPPS initiative with the collaboration of the U.S. Department of Defense (DOD). The TeamSTEPPS initiative is based on the twenty years of experience and research on team training from the aviation, military and healthcare (Mayer et al., 2011); and thus, is an evidence-based team training program. Its aim is to provide a systematic approach to increase the quality, efficiency and safety of patient care (Parker, Forsythe, & Kohlmorgen, 2018). As can be seen from Figure 2.3., which represents the conceptual framework of the TeamSTEPPS (Ballangrud et al., 2017), leadership, communication, mutual support, and situation monitoring are at the heart of the TeamSTEPPS framework, which are similar to the core components previously introduced by Salas et. al's (2005) Big Five model.

To achieve its aim of providing a systematic approach to increase the quality, efficiency and safety of patient care, the TeamSTEPSS program suggests that team structure and teamwork skills of medical teams be improved through training. Thus, the TeamSTEPSS is based on the idea that team training can enhance attitudes (i.e., mutual

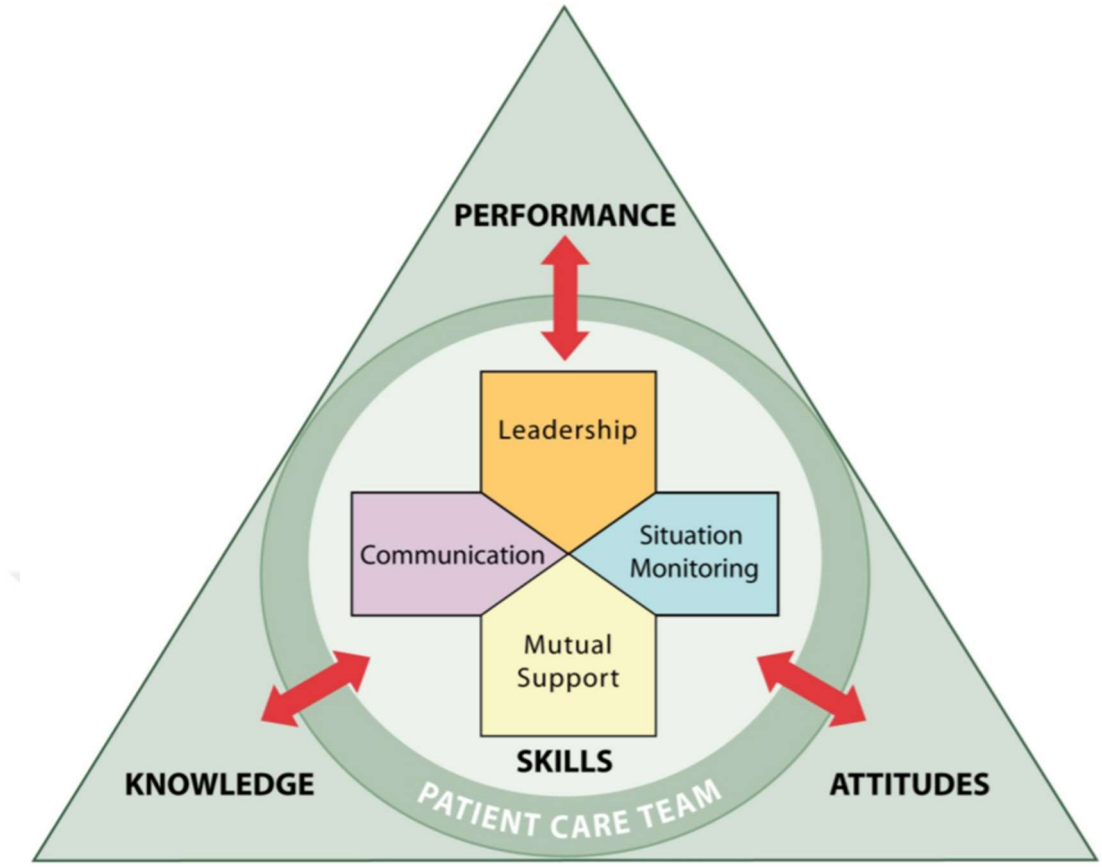

Figure 2.3. TeamSTEPPS Model of Team Training (AHRQ, 2013)

trust and team orientation), knowledge (i.e., shared mental model) and performance (i.e., adaptability, accuracy, productivity, efficiency and safety) of health care staff through improvement on team competency outcomes, and thus efficiency and effectiveness of medical teams (AHRQ, 2013).

Within the TeamSTEPPS program, the AHRQ set a curriculum for educating medical staff and developed several measurement instruments, including The Hospital Survey on Patient Safety Culture (HSOPS), the Teamwork Attitudes Questionnaire (T-TAQ), the Teamwork Perceptions Questionnaire (T-TPQ), Team Assessment Questionnaire, Self-Assessment Questionnaire and Trauma Performance Observation Tool (TPOT) (Capella et al., 2010; Parker et al., 2018; Weaver, Dy, & Rosen, 2014).

The TeamSTEPPS curriculum has been implemented over the years in various clinical settings, such as operating room (OR) (e.g., Forse, Bramble, & McQuillan, 2011), emergency department (ED) (e.g., Lisbon et al., 2016), trauma (e.g., Capella et al., 2010),

ambulatory care (e.g., Paul et al., 2017), obstetric unit (OB) (e.g., Sonesh et al., 2015), and pediatric (PICU) and surgical (SICU) intensive care units (e.g., Mayer et al., 2011).

Research on TeamSTEPPS intervention has shown that the implementation of the program is associated with increased teamwork skills (e.g., Brock et al., 2013; Gaston, Short, Ralyea, & Casterline, 2016; Lisbon et al., 2016; Sheppard et al., 2013; Sweigart et al., 2016; Wong, Gang, Szyld, & Mahoney 2016), team efficiency (e.g., Capella et al., 2010), patient satisfaction and safety culture (e.g., Cooke, 2016), patient outcomes (e.g., Forse et al., 2011; Riley et al., 2011), staff outcomes (e.g., Harvey, Echols, Clark, & Lee, 2014; Howe, 2014) and decreased medical errors (e.g., Deering, 2011; Forse et al., 2011; Mayer et al., 2011), and hence improved patient safety.

The literature review presented above shows the importance of team training interventions for providing more efficient and safer patient care. In order to devise proper training programs aimed at improving healthcare teams and assess their effectiveness, there is a need for reliable and valid measurement instruments. The following part reviews the existing approaches for the assessment of teamwork performance in healthcare settings.

2.2.4. Measurement of Teamwork in Healthcare

In the research on team training, measuring teamwork performance is critical to identify whether the intervention is effective and is able to produce desired outcomes. Various types of measurement tools have been developed by researchers for assessing teamwork in healthcare (Havyer et al., 2014; Manser, 2009). Much of these instruments are based on two prevalent approaches: observation and self-report (Rosen, Dietz, Yang, Priebe, & Pronovost, 2014). In observational studies, one or more trained observers are present during the process of delivering medical services to identify problems and grade the items in the assessment tools (e.g., Catchpole et al., 2007; Lamb, Wong, Vincent, Green, & Sevdalis, 2011; Lingard et al., 2004; Wiegmann et al., 2007). Even though observational measures are reliable and valid instruments, considering the fact that such studies require tremendous effort and time for training, observing and grading, this method is considered an inefficient way of measuring team performance (Rosen et al., 2014).

The other method for evaluating teamwork performance in healthcare is self-report surveys. This method involves asking team members to assess the performance of themselves as an individual or their unit as a team (e.g., Malec et al., 2007). Although there are some critics pointing out the limitations of self-assessment, such as systematic bias in self-ratings, low response rates, and high missing values (Dunning, Johnson, Ehrlinger, & Kruger, 2003; Kruger & Dunning, 1999), this method is one of the most commonly used means of assessing teamwork. Havyer et al. (2014) reviewed the measurement tools for evaluating teamwork in the health context. The authors examined 178 studies and identified 73 different quantitative measurement tools for teamwork assessment. Much of these were measuring participants' subjective assessments regarding teamwork attitudes, skills and knowledge as well as their perceptions (Havyer et al., 2014).

As pointed out in the previous part above, within the TeamSTEPPS program, a number of measurement instruments were developed, including The Hospital Survey on Patient Safety Culture (HSOPS), the Teamwork Attitudes Questionnaire (T-TAQ), the Teamwork Perceptions Questionnaire (T-TPQ), Team Assessment Questionnaire, Self-Assessment Questionnaire (Parker et al., 2018; Weaver et al., 2014) and Trauma Performance Observation Tool (TPOT). These measurement tools developed by AHRQ have drawn considerable attention from scientists and were tested in various contexts. For example, the Hospital Survey on Patient Safety Culture (HSOPS), which is used to evaluate the safety culture of a health organization, has been translated into many languages (Abdallah, Johnson, Nitzl, & Mohammed, 2020; Chen & Li, 2010; Nie et al., 2013; Smits et al., 2008), including Turkish (Bodur & Filiz, 2010). Similarly, the Trauma Performance Observation Tool (TPOT) was administered to assess team performance of trauma teams and to determine the effectiveness of the TeamSTEPPS program with pre/post-training design (e.g., Capella et al., 2010; Harvey et al., 2019).

The two complementary measurement instruments proposed within the TeamSTEPPS curriculum; namely, The Teamwork Attitudes Questionnaire (T-TAQ) and the Teamwork Perceptions Questionnaire (T-TPQ), were also widely-tested in different countries. For example, T-TAQ, which was developed to measure for assessing team members' attitudes, knowledge and skills regarding teamwork (Baker, Amodeo, Krokos, Slonim, & Herrera, 2010), was tested and validated in Norway (Ballangrud, Husebø, &

Hall-Lord, 2019) and Iran (Minoo, Fatemeh, Maryam, & Mandana, 2013) (see also Table 2.3). The questionnaire was also tested in Turkey by Yardımcı et al. (2012). The sample of Yardımcı et al.'s (2012) study consisted of 150 healthcare professionals (i.e., 112 nurses and 38 physicians) working in the pediatric setting of a training and research hospital in Turkey. The authors performed factor analyses to examine whether the factor structure of the Turkish version of the T-TAQ was similar to the original version. Even though four items were eliminated due to low factor loadings, based on the results of the factor analyses carried out, the authors validated the five-factor structure of the T-TAQ in the Turkish context. The Turkish version of T-TAQ, which was validated by Yardımcı et al. (2012), was employed in different healthcare settings in Turkey (e.g., Başoğul, 2020; Çelik et al., 2019; Uslu-Sahan & Terzioğlu, 2020). For example, Çelik et al. (2019) carried out a correlational study in the surgical setting with a sample of 116 nurses. The authors investigated the impact of teamwork attitudes of nurses, which was measured by means of T-TAQ, on their caring behaviors and found that caring behaviors of nurses were positively and significantly related to their teamwork attitudes. Uslu-Sahan and Terzioğlu (2020) examined whether simulation training programs have an impact on healthcare professional students' knowledge, education perception and teamwork attitudes. According to the results of the study conducted with 84 students, concurrent application of high fidelity simulation and hybrid simulation programs was found to be effective in the improvement of students' palliative care knowledge, education perception and teamwork attitudes.

Similarly, T-TPQ, which was developed to evaluate healthcare givers' perceptions toward teamwork in their units (Battles & King, 2010), was also tested in different countries. Table 2.3. summarizes the psychometric properties of the T-TPQ in different countries. As the table indicates, the T-TPQ has also been found to be a reliable and valid measurement tool for the assessment of teamwork perceptions in different countries. Several studies employed the T-TPQ to determine the impact of the TeamSTEPPS team training intervention on the perceptions of health staff on teamworking (e.g., Carson, Laird, Reid, Deeny, & McGarvey, 2018; Costa & Lusk, 2017; Dodge et al., 2020; Palmer, Labant, Edwards, & Boothby, 2019).

As pointed out above, even though T-TPQ was tested and validated in various countries, to the best of my knowledge, its psychometric properties have not been tested

in Turkey. Therefore, the present study was conducted with the purpose of testing the Turkish version of the T-TPQ. In doing so, it is expected that the Turkish version of the T-TPQ contributes to the existing body of knowledge in healthcare setting in Turkey, enabling to assess the need for, and effectiveness of, team training programs devised for improving the functioning of healthcare teams. The current study is also expected to enable cross-cultural research to be conducted; and thus, serving to create a cumulative knowledge on the topic. The following chapter is devoted to describing the research method followed in this thesis.

Table 2.3. The Psychometric Properties of the T-TPQ in Different Contexts

Publication	Context	Sample size (N)	Reliability (Cronbach's Alpha Coefficients)						Validity (CFA Fit Indices)			
			Entire scale	Team structure	Leadership	Situation monitoring	Mutual Support	Communication	*x2*/df	CFI	TLI	RMSEA
Battles & King (2010) (AHRQ, development of the T-TPQ)	American	169	n/a	0.89	0.95	0.91	0.9	0.88	n/a	n/a	n/a	n/a
Keebler et al. (2014)	American	1700	0.98	0.92	0.96	0.94	0.92	0.934	6.59	0.947	0.942	0.057
Hwang & Ahn (2015)	Korean	522	0.96	0.86	0.94	0.9	0.85	0.89	n/a	0.891	n/a	0.067
Ballangrud, Husebø, & Hall-Lord (2017)	Norwegian	247	n/a	0.79	0.84	0.83	0.84	0.81	1.76	0.888	0.878	0.056
Lakatamitou et al. (2020)	Greek	292	0.95	0.857	0.93	0.85	0.81	0.85	2.05	0.994	0.994	0.060
Hall-Lord et al. (2020)	Swedish	450	0.94	0.85	0.92	0.87	0.85	0.79	2.25	0.909	0.901	0.055

CHAPTER 3

3. RESEARCH METHOD

This chapter provides information regarding the research methods used in this study. The first part elucidates the research design, study sample and data collection procedure. The second part introduces the measurement tools employed to collect data from the sample. The third part elaborates the scale adaptation procedure. Lastly, the fourth part gives information about the data analysis procedure.

3.1. STUDY DESIGN, SAMPLE AND DATA COLLECTION

This thesis aimed to examine the validity of the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) in the Turkish context. A cross-sectional design was applied to achieve this purpose. The reason for preferring the cross-sectional research design was that it permits researchers to capture a social phenomenon swiftly and efficiently at a specific point of time (Neuman, 2013).

In the current study, the target population was the frontline healthcare professionals (i.e., physicians, nurses, midwives, health technicians, physiotherapists and dieticians) working in hospital settings in Turkey. Convenience sampling, a type of non-probability sampling technique, was employed to recruit participants. Even though this method is one of the non-probability sampling techniques and presents selection bias that reduces the generalizability of the findings, it is widely used in social science studies for its features, such as making the access to the possible respondents easy and survey process cheap and quick to administer (Neuman, 2013). For its such features, therefore, by using convenience sampling, health caregivers were recruited from four hospitals located in two different cities in Turkey. Three hospitals, one of which was a private hospital and the other two were state hospitals, were located in the same city. The fourth one was a training and research hospital placed in a different city and owned by the public. The data were collected during three consecutive weeks between September 14 and October 4, 2020.

The participants were informed with an introductory text placed at the beginning of the questionnaire in which the aim of the study was explained and voluntary participation, anonymity and confidentiality were ensured. The researcher who conducted this current study personally distributed total of 364 hard copies of the questionnaire to his acquaintances who worked in various capacities (e.g., physician, nurse, unit managers, etc.) in the above-mentioned four hospitals. These individuals were asked to answer the questions by taking instructions into account. They were also asked to distribute the questionnaire to their colleagues working in different capacities in the same hospital. After excluding 126 questionnaires with incomplete information or inconsistent responses, which suggested that the questionnaires were filled out without paying attention to the question items, statistical analyses were performed with the data obtained from 238 respondents in total. The following part introduces the measurement tools employed in this study.

3.2. MEASUREMENT

The purpose of this thesis was to adapt the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) to the Turkish context and examine its validity. Therefore, the primary tool for collecting data is the T-TPQ. The reason for choosing the T-TPQ was that it is a comprehensive measurement tool for assessing teamwork perceptions of healthcare personnel, comprising of all components of effective teamwork. Another reason was that the scale was tested in several contexts, which makes it a well-established scale and valuable for future cross-cultural research.

The T-TPQ is a self-report questionnaire that aims at measuring the teamwork perceptions of healthcare workers. It consists of 35 items in five subdimensions: team structure, leadership, situation monitoring, mutual support and communication. By using a five-point Likert scale from “totally disagree” to “totally agree”, the respondents were asked to rate the degree to which they agree with the statements regarding teamwork in their unit (see Appendix 1 for the original version of the T-TPQ). The higher scores in T-TPQ indicates a higher level of teamwork in a unit. Apart from the T-TPQ, demographic data on respondents were collected through seven questions: gender, age, level of

education, marital status, occupation, years of experience and the ownership type of the institution where the respondent works for. The next part aimed at elaborating the scale adaptation procedure applied in this study.

3.3. SCALE ADAPTATION PROCEDURE

Over the last few decades, cross-cultural research has become an important issue in many domains, including healthcare. For such studies, it is vital to measure the same phenomena across countries and cultures in a way that does not create any methodological biases so that the results are reliable, valid, and comparable across countries and contexts. For this purpose, several studies have been conducted on how a measurement tool should be transferred from one language and culture to another (e.g., Ægisdóttir, Gerstein, & Çinarbaş, 2008; Brislin, 1970, 1976; Hambleton & Zenisky, 2011; Van de Vijver & Hambleton, 1996; Van de Vijver & Poortinga, 1997), having created a great body of knowledge on scale adaptation methodology. In addition, the International Test Commission (ITC) published an article proposing a set of guidelines for translating and adapting tests (International Test Commission, 2017). In this vein, this thesis was designed to follow the procedure and recommendations produced by these studies on scale adaptation methodology.

Before starting the study, various ethical considerations were handled. The written permission was obtained from the AHRQ for translating the T-TPQ into Turkish (see Appendix 2). Also, ethics committee approval (see Appendix 3) was received from the Research Ethics Committee of Abdullah Gül University, where the author of the present study is employed as a research assistant. After the ethical requirements were fulfilled, the following steps, which were suggested by research on scale adaptation, were followed.

The first step of the scale adaptation process is to justify to conduct a scale adaptation study. Based on a comprehensive literature review, researchers should be able to argue that there is a need for such a research effort (Hambleton & Patsula, 1999). If there is an existing reliable and valid measurement tool measuring the intended construct in that context, then it means no need for such a study. In this sense, as pointed out in Part

2.2.4., the literature review indicated that no research efforts have been made to measure the perceptions of health caregivers toward teamwork in the Turkish context by considering the cultural and contextual differences. This gap was the primary motivation for this scale adaptation study.

The second step of the process is to translate the questionnaire from the original language to the target language (Ægisdóttir et al., 2008). This step requires at least two experts who have a good mastery of both languages and cultures. In addition, it is suggested that translators should be familiar with the construct aimed to be measured (International Test Commission, 2017). Therefore, in this thesis, the translation of the scale was conducted by two bilingual research assistants. Each of the items of the scale was discussed with translators after they completed the translation from English to Turkish.

After the translation of the scale from the original language to the target language, the third step is the backward translation (Brislin, 1976). The backward translation refers to the translation of scale from the target language to the original language again. This step is indispensable for scale adaptation studies to ensure that the meanings of items in the scale are translated into the target language accurately. The backward translation should be conducted by at least two bilingual experts who are blinded to the original version of the scale (International Test Commission, 2017). In this thesis, the backward translation was carried out by two bilingual academicians who did not see the original scale. In this phase, it was observed that the backward translation was almost identical to the original one, with only few numbers of wording differences. For example, the verb ‘model’ in the item 'My supervisor/manager models appropriate team behavior.’ was translated differently. Similarly, the translation of the verb ‘advocate’ in the item ‘Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit.’ pointed out the need for reexpressing this item. Taking together, however, these few number wording differences indicated that the translation was smooth and was close to flawless. Differences between the backward translation and the original scale were examined and necessary alterations were made in the translation before taking expert opinion.

The fourth step in scale adaptation procedure is to gather expert opinion regarding the translation (Hambleton, 2005). According to the recommendations (International Test Commission, 2017), three forms of the instrument (i.e., original version; translated version; back-translated version) should be reviewed by bilingual experts to assess the equivalence of the questionnaires. In this study, the two bilingual faculty member working at two different state universities, one of them is also a certified public translator, evaluated the equivalence of the original scale and the translated version of the scale. Both of the experts interviewed stated that the statements of the questionnaire were explicit, with one exception; namely, the item number 26 (e.g., 'Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit.'). This item was considered to be ambiguous by experts, raising the question of whether the statement is meaningful in the Turkish healthcare setting. In this phase, the translation was retained and the item was decided to be consulted to practitioners in pilot testing step. Except for this item, the Turkish version of the questionnaire was regarded as appropriate for the use in the Turkish healthcare context.

The fifth step of the scale adaptation process before collecting quantitative data from the sample is pilot testing (Hambleton, Merenda, & Spielberger, 2004). The aim of the pilot testing is to make sure that the items in the survey are perceived by respondents correctly. The pilot study is widely employed in scale adaptation studies to investigate the semantic equivalence of the instruments in two languages (International Test Commission, 2017). In this study, the pilot test was conducted with four physicians and eight nurses working in a privately owned hospital located in Ankara, the capital city of Turkey. The participants were explained about the aim of the study and then were asked to rate each statement on a scale from 1 to 5 as to whether the items are clear, relevant and understandable. As it was mentioned in the previous paragraph, item number was particularly asked physicians and nurses as to what they understood with this statement. Feedback obtained from one of the physicians was quite expository and valuable who pointed out that privately-owned healthcare institutions may not act to the best interest of patients due to financial considerations. He exemplified that some of the privately-owned hospitals may dictate physicians to offer unnecessary treatments or interventions to patients, which may create conflicts between a physician and his/her manager due to ethical reasons. This feedback provided insight regarding the meaning of the item and

allowed the researcher to reexpress it. Along with this item, only few items were found to be confusing by some of the interviewees. (e.g., 'Staff continuously scan the environment for important information.'; 'Staff seek information from all available sources.'). These items were related to information scanning behaviors of the health personnel and led interviewees to struggle to comprehend the scope or extent of the information-seeking behavior. The items that were found to be vague were discussed with respondents as to how they can be better articulated. In line with these discussions in pilot tests, some of the items in the questionnaire were modified in order to enhance clarity and understanding. After making these modifications, the final version of the translated instrument emerged (see Appendix 4).

The last step in the scale adaptation involves presenting evidence of construct validity and reliability for the questionnaire. For this purpose, various analyses were carried out, as presented below.

3.4. DATA ANALYSIS PROCEDURE

SPSS (Statistical Package for the Social Sciences) version 22 and AMOS (Analysis of Moment Structures) version 23 were used to analyze data. Before moving to the scale validation analyses, the assumption of normality, which is a basic assumption of many statistical analyses, was evaluated. For this purpose, univariate normality was assessed using the skewness and kurtosis statistics, and multivariate normality was tested with Mardia's multivariate kurtosis coefficient (Mardia, 1970). The results are shown in Table 3.1. The absolute values of the skewness and kurtosis for all the five variables did not indicate a substantial departure from acceptable scores; that is, the skewness and kurtosis statistics were lower than the absolute values of 3 and 8, respectively, as suggested by Kline (1998). Mardia's multivariate coefficient for all the variables was 23.431, which exceeds the threshold value of 10 (Kline, 1998), suggesting that data may be multivariate non-normal. However, since multivariate normal distribution is substantially affected by the sample size (Byrne, 2010), caution is necessary to conclude that the data were multivariate non-normal. Furthermore, since skewness and kurtosis statistics indicated that the data were univariate normal, it can be concluded that the data

were not severely non-normal. For this reason, the maximum likelihood estimation (MLE) technique, which is quite robust to slight or moderate deviation from multivariate normality (Bollen, 1989), was used in further analyses (i.e., in Confirmatory Factor Analysis, (CFA), which reported in Chapter 4. Missing values were another concern that was handled before moving to scale validation. Missing values were replaced by the mean value of the non-missing item scores. After the replacement of missing values with imputed data, descriptive statistics were produced to characterize the study sample as well as to calculate mean scores and standard deviations for the dimensions and their items of the T-TPQ.

Table 3.1. Skewness, Kurtosis, and Mardia's Coefficient Values

Variable	Skewness	Kurtosis
(Mean) Team Structure	-0.659	0.357
(Mean) Leadership	-0.141	-0.787
(Mean) Situation Monitoring	-0.661	0.415
(Mean) Mutual Support	-0.673	0.511
(Mean) Communication	-0.871	1.221
Mardia's Coefficient		23.431

Considering the fact that the scale intended to be adapted to the Turkish context (i.e., T-TPQ) has been translated into many languages and verified in various countries (see Table 2.3.), it is possible to consider it a well-established measurement tool. Therefore, it was concluded that there was no need to explore the factor structure of the scale by means of Exploratory Factor Analysis (EFA) (Neuman, 2013). For this reason, the reliability of the Turkish version of the T-TPQ was first assessed; then, confirmatory factor analysis (CFA) was carried out to test its dimensionality and to analyze whether the factor structure of the Turkish version is similar to that of the original version.

CFA is a widely used technique for scale validation. It produces various goodness-of-fit indices that are used to evaluate how well the data collected from the respondents fit the model (i.e., factor structure) suggested by the original scale. In this study, the following indices were utilized in line with the previous studies that evaluated the validity

and reliability of the T-TPQ in different contexts (e.g., Ballangrud et al., 2017; Keebler et al., 2014; Lakatamitou et al., 2020):

- The Relative Chi-Square (CMIN/df)
- The Root Mean Square Error of Approximation (RMSEA)
- The Standardized Root Mean Square Residual (SRMR)
- The Tucker- Lewis Index (TLI)
- The Comparative Fit Index (CFI).

The Relative Chi-Square (x^2/df) is a ratio extensively employed as a measure of fit. It indicates the minimum discrepancy per degree of freedom. CMIN/DF < 3 is considered a satisfactory fit between the hypothetical model and sample data (Kline, 1998), and values between 3 and 5 indicate a reasonable fit (Marsh & Hocevar, 1985). The RMSEA is an absolute fit index and is considered the most robust indicator of model fit (MacCallum & Austin, 2000), measuring the approximate fit of the model in the population. The RMSEA values between .05 and .08 show an acceptable fit for the model and lower than .05 represent a strong model fit (Polit & Yang, 2016). The SRMR is a measure of model fit that refers to the standardized difference between the observed correlation and the predicted correlation. The SRMR is a measure of model fit that refers to the standardized difference between the observed correlation and the predicted correlation. As the SRMR values get closer to zero, the model demonstrates a better fit. The SRMR values between .05 and .08 indicate an acceptable fit and values lower than 0.05 good fit for the model (Hu & Bentler, 1999). CFI and TLI indices represent the ratio of the discrepancy between the data and the hypothesized model, both of which should be above 0.95 for a good model fit, or above 0.90 for an acceptable fit (Tabachnick & Fidell, 2007).

CFA also produces factor loadings (standardized regression weights). These loadings were used to provide evidence of convergent validity and discriminant validity. The average variance extracted (AVE) values and interscale correlations were employed for this purpose. Convergent validity refers to the degree to which subdimensions of a construct are related to each other (Fornell & Larcker, 1981). The values of AVE above 0.50 present the evidence of convergence between subscales. Discriminant validity, on

the other hand, refers to the degree of distinctiveness of a subscale among other subscales measuring a construct (Kline, 1998). The square root values of the AVE scores higher than the correlations between subscales indicate good discrimination of the construct's subscales.

As explained in the next chapter, the CFA did not establish the validity of the scale. To explore the dimensionality and underlying factors of the scale in the Turkish context; and thus, to identify the sources of poor fit, Exploratory Factor Analysis (EFA) was performed. Sampling adequacy for EFA was determined analyzing the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity. If the value of KMO is greater than 0.60 and Bartlett's test is significant, the sample is said to be adequate for conducting an EFA (Field, 2013).

Factors with eigenvalues greater than 1 were extracted with principal components analysis (PCA) and rotated with varimax rotation (Fayers & Machin, 2000). Items exceeding the 0.40 cutoff value were kept if they were not cross-loaded on different factors (i.e., items were eliminated if they were loaded on two or more factors with loadings greater than 0.40 and with a difference of less than 0.20) (Hilari, Byng, Lamping, & Smith, 2003). Cross-loaded items were eliminated starting from the item that cross-loaded most significantly. This procedure was repeated until EFA produced no cross-loaded items. Then, a second CFA was conducted in order to verify the factor structure generated through EFA. By using the results of this second CFA, convergent validity and discriminant validity were analyzed by following the procedures explained above.

In order to test the internal consistency of the final instrument, composite (or construct) reliability (CR) coefficient and Cronbach's alpha scores were employed. The composite reliability coefficient greater than 0.70 indicates good internal consistency (Chin, 1998). Cronbach's alpha coefficients were computed for each subscale (i.e., for each of the five dimensions of teamwork) and also for the entire scale. Cronbach's alpha coefficients greater than 0.70 indicates a high level of internal consistency (Nunnally, 1978; Polit & Yang, 2016). The following chapter presents the results of data analyses.

CHAPTER 4

4. RESULTS

This chapter presents the results of the current study and consists of two main parts. The first part explains the description of the sample. The second part explains the factor structure of the model (e.g., of the Turkish version of the T-TPQ).

4.1. DESCRIPTION OF THE SAMPLE

This study was conducted to investigate whether the adapted Turkish version of the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) is a valid and reliable measurement tool. For this purpose, data were collected from 238 respondents. Descriptive statistics were utilized to investigate the characteristics of the respondents (e.g., of the sample). Table 4.1. summarizes the demographic profile of the respondents participating in the research. Majority of the respondents were female (60.5%). Nearly half of the sample was between the ages of 26 and 35 (48.3%). The number of married participants (57.1%) and single participants (42.9%) were close. Most of the participants had at least a bachelor's degree (68.1%) and more than 90% of them went to college. The distribution of the participants in terms of their occupations was quite homogenous. The sample was comprised of 69 physicians (29%), 67 nurses (28.2%), 24 midwives (10.1%), 57 health technicians (23.9%), 18 physiotherapists (7.6%) and 3 dieticians (1.3%). Almost one third of the participants had experience from 1 to 5 years (32.4%) and more than 40% of them had experience for more than 11 years. Lastly, the substantial proportion of the respondents were employees of state hospitals (91.2%).

Table 4.1. The Demographic Characteristics of Participants (N = 238)

Demographic factors	Frequency	Percentage
Gender		
Female	144	60.5%
Male	94	39.5%
Age		
25 and below	35	14.7%
26-35 years	115	48.3%
36-45 years	61	25.6%
46-55 years	18	7.6%
56 and above	9	3.8%
Marital status		
Married	136	57.1%
Single	102	42.9%
Level of education		
High schools and their equivalents	23	9.7%
Associate degree	53	22.3%
Undergraduate	114	47.9%
Graduate	48	20.2%
Occupation		
Physician	69	29.0%
Nurse	67	28.2%
Midwife	24	10.1%
Health technician	57	23.9%
Physiotherapist	18	7.6%
Dietician	3	1.3%
Years of experience		
Less than 1 year	19	8.0%
1 to 5 years	77	32.4%
6 to 10 years	48	20.2%
11 to 15 years	35	14.7%
16 to 20 years	29	12.2%
More than 21 years	30	12.6%
Hospital ownership		
State	217	91.2%
Private	21	8.8%

4.2. THE FACTOR STRUCTURE OF THE MODEL

The second part of this chapter consists of three sections. The first section presents the results of the first Confirmatory Factor Analysis (CFA). The second section shows the results of exploratory factor analyses (EFA). The third section deals with the second CFA analysis conducted after the EFA in the previous step.

4.2.1. Testing the Five-Factor Structure of the T-TPQ – First CFA

Before the factor structure of the Turkish version of the T-TPQ was examined, reliability analyses were conducted through Cronbach's alpha values in order to evaluate the internal consistency of the initial version of the instrument. The analyses indicated that the Turkish version of the T-TPQ (35 items) demonstrated a high level of internal consistency for all subscales, ranging from 0.868 (mutual support) to 0.951 (leadership). The reliability coefficient for the entire scale was 0.959.

In order to investigate the construct validity of the Turkish version of T-TPQ, Confirmatory Factor Analysis (CFA) was performed by utilizing the maximum likelihood estimation. The (initial) results demonstrated a poor fit with the data (x^2 (df) 1419.83 (550), $p < 0.001$, RMSEA = 0.082, SRMR = 0.0635, TLI = 0.850, CFI = 0.860). Therefore, the modification indices were examined to identify possible sources of poor fit and determine whether the goodness-of-fit statistics can be improved. This examination suggested that four pairs of error terms (i.e., e2-e3; e6-e7; e12-e13 and e22-e23) be correlated to obtain a better fit. Table 4.2. shows the Modification Indices (MIs) produced by AMOS as well as the questionnaire items corresponding to each pair of error terms. In line with the work of Keebler et al. (2014), appropriate modifications were made. Error terms under the same observed variables that had high modification indices were correlated to improve the model fit. Thus, (see Figure 4.1.).

As can be observed from Table 4.2. and from Figure 4.1., these modifications included the error terms of item number 2 (e2) and item number 3 (e3) and item number 6 (e6) and item number 7 (e7) under team structure, those of item number 12 (e12) and item number 13 (e13) under leadership and those of item number 22 (e22) and item number 23 (e23) under mutual support.

Table 4.2. Modification Indices for Initial Model - First CFA

Error terms	Items	Modification Indices between error terms
e2	Staff are held accountable for their actions.	45.133
e3	Staff within my unit share information that enables timely decision making by the direct patient care team.	
e6	My unit has clearly articulated goals.	38.505
e7	My unit operates at a high level of efficiency.	
e12	My supervisor/manager resolves conflicts successfully.	55.131
e13	My supervisor/manager models appropriate team behavior.	
e22	Staff assist fellow staff during high workload.	40.821
e23	Staff request assistance from fellow staff when they feel overwhelmed.	

To assess if correlating these error terms, which are shown in Figure 4.1., were legitimate, the questionnaire items belonging to these error terms examined (see Table 4.2.). This assessment suggested that correlating the above-mentioned error terms were logical. For example, under team structure, the error terms e6 and e7 can be correlated because the respondents could have perceived that having clearly articulated goals in his/her unit (i.e., the questionnaire item for e6) helps to operate at a high level of efficiency (i.e., the questionnaire item for e7). Similarly, the error terms e2 and e3 can be correlated because the questionnaire items of these error terms might have been perceived by the respondents as related to each other due, for example, to acquiescent response (i.e., respondent's tendency to agree with attitude statements regardless of the content of the question) or personal traits, such as reading disability (Brown, 2015). In the same vein, the error terms e12 and e13 under leadership can also be correlated because their questionnaire items both imply that the respondents' supervisors/managers are actively involved in the team process. Finally, correlating the error terms e22 and e23 under mutual support is also legitimate because their questionnaire items might have been perceived by the respondents as highly related.

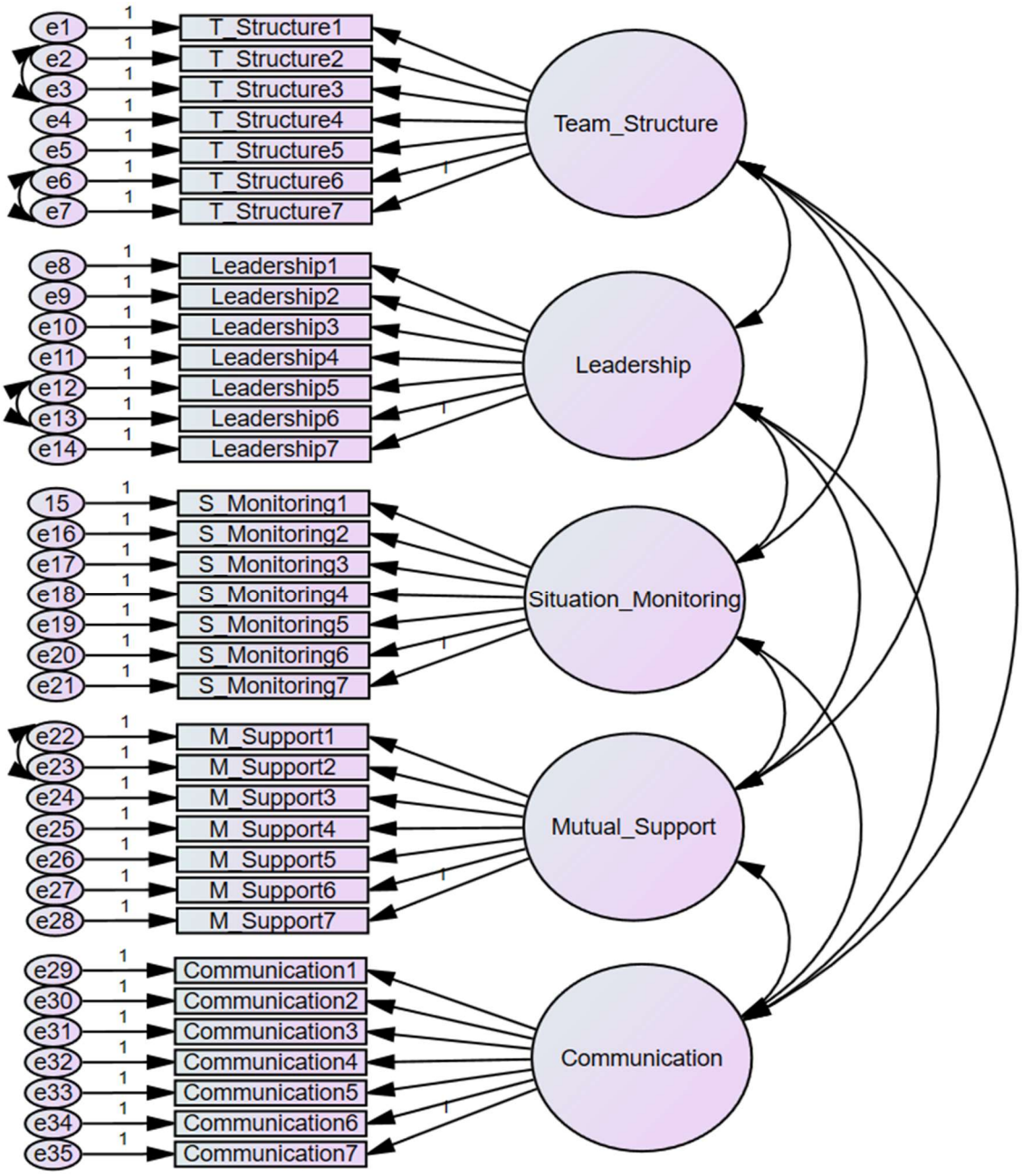

Figure 4.1. First CFA - Modified Model

After correlating the above-mentioned error terms, the modified model in Figure 4.1. was generated and its goodness-of-fit indices were calculated in AMOS. Table 4.3. demonstrates, for both initial and modified models, the expected (or desired) cutoff values and the observed cutoff values, which were obtained in this study. While the table indicates a reasonable fit with regard to some fit indices (e.g., RMSEA, SRMR, etc.), it

also suggests that a better fit be achieved with regard to other fit indices (e.g., CFI, etc.). For this reason, it was concluded that the final model in Figure 4.1. represents an acceptable fit.

Table 4.3. The Goodness of Fit Indices - First CFA

	Good Fit	Acceptable Fit	Initial Model	Modified Model
CMIN			1419.83	1217.10
df			550	546
CMIN/*df*	< 3	< 5	2.582	2.229
RMSEA	< 0.05	< 0.08	0.082	0.072
SRMR	< 0.05	< 0.08	0.0635	0.0586
CFI	> 0.95	> 0.90	0.862	0.893
TLI	> 0.95	> 0.90	0.850	0.884

(1) RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index; CFI, comparative fit index

Since the goodness-of-fit indices suggest that the five-factor structure of the Turkish version of the T-TPQ acceptably or moderately fit the data, convergent validity and discriminant validity were assessed. For this purpose, AVE values, the square root of AVE, and the correlations between subscales were calculated, which are reported in Table 4.4.

Table 4.4. The AVE Values, The Square root of AVE, and Interscale Correlations – First CFA

Subscales	AVE	Square root of AVE	Leadership	Situation Monitoring	Mutual Support	Communication
Team Structure	0.550	0.742	0.514	0.779**	0.673	0.629
Leadership	0.727	0.853	1	0.559	0.547	0.429
Situation Monitoring	0.542	0.736		1	0.819**	0.698
Mutual Support	0.488*	0.699			1	0.717**
Communication	0.619	0.787				1

(1) *AVE values lower than 0.5, indicating non-convergence between subscales.

(2) ** Correlations higher than the square root of AVE values, indicating poor discriminant validity.

Regarding convergent validity, the AVE values were examined. As can be seen in Table 4.4., the AVE scores were calculated as .550 for 'team structure', .727 for 'leadership', .542 for 'situation monitoring', .488 for 'mutual support' and .619 for 'communication'. These results indicated that convergent validity was not achieved due to the AVE score of the dimension of 'mutual support' being less than 0.50. Similarly, in the comparison between the square root of AVE of subscales and interscale correlations, discriminant validity was not obtained due to three correlations. First, the correlation between team structure and situation monitoring (0.779) was higher than the square root of AVE values of both team structure (0.742) and situation monitoring (0.736). Second, the correlation between situation monitoring and mutual support (0.819) was higher than the square root of AVE values of the dimensions of both situation monitoring (0.736) and mutual support (0.699). Third, the correlation between the dimensions of mutual support and communication (0.717) was higher than the square root of AVE values of mutual support (0.699). These results demonstrated that subscales of the Turkish version of the T-TPQ were not sufficiently different from each other, limiting our ability to provide evidence of discriminant validity.

As it was mentioned in Table 2.3., the T-TPQ is a well-established measurement tool that was assessed in different contexts. However, the fact that convergent validity and discriminant validity were not achieved in the Turkish context raised a question regarding the factor structure of the T-TPQ in the Turkish context. In addition, the fact that Yardımcı et al. (2012) also failed to verify, without dropping items, the factor structure of the T-TAQ (i.e., the complementary tool of the T-TPQ) led the researcher of the present study to conduct Exploratory Factor Analysis (EFA) in order to explore the dimensionality of the Turkish version of the T-TPQ and determine the reasons for why the scale might have failed in convergent and discriminant validity analyses.

4.2.2. Exploring the Dimensionality of the T-TPQ - EFA

To ensure that the sample was adequate for Exploratory Factor Analysis (EFA), Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity was evaluated. Bartlett's test of sphericity was significant ($\chi 2$ (406) = 5303,72; p = 0.00) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.925, indicating that the sample was adequate for factor analysis. By following the procedures

in Part 3.4., EFA was performed repeatedly until all items cross-loaded on multiple factors were eliminated completely. Initial analysis with varimax rotation extracted a six-factor solution (eigenvalue >1), which explained 70.4% of the total variance (see Table 4.5). This result was not consistent with the five-factor model of the original T-TPQ.

Table 4.5. Eigenvalues and Percentages of Variance Explained – First EFA

Factors	Eigenvalues	Rate of Variance Explained	Total Rate of Variance Explained
1	14.800	42.287	42.287
2	3.434	9.811	52.098
3	2.176	6.216	58.314
4	1.855	5.300	63.614
5	1.273	3.636	67.250
6	1.046	2.988	70.238

Examination of the factor loadings in Table 4.6. indicated that there were three items cross-loaded with values higher than 0.4 (i.e., ‘mutual support6’, ‘team structure1’ and ‘situation monitoring7’). In addition, the items ‘mutual support5’, ‘mutual support7’ and ‘situation monitoring7’ implied a possible sixth factor, which was not part of the original scale. Following the procedures in Part 3.4., the item mutual support6 was firstly eliminated. After dropping the item mutual support6, there was only one item (i.e., ‘situation monitoring7’) cross-loaded on the six-factor structure. Secondly, this item (i.e., ‘situation monitoring7’) was deleted and EFA was performed again. This time, after excluding the item ‘situation monitoring7’, varimax rotation extracted a five-factor structure, and two cross-loaded items emerged (i.e., ‘mutual support7’ and ‘situation monitoring5’). Thirdly, the item ‘situation monitoring5’ was deleted because the difference between its factor loadings on two factors was less than those of ‘mutual support7’. After the exclusion of 'situation monitoring5', the five-factor structure was retained, however, two items were cross-loaded (i.e., mutual support5 and mutual support7). Fourthly, the item mutual support7 was excluded and the EFA was conducted one more time. Following the exclusion of the item mutual support7, there was only one cross-loaded item; namely team structure1. Therefore, this item was removed, and the analysis was repeated. The subsequent analysis produced one cross-loaded item; namely

situation monitoring6. After deleting this item and performing EFA again, the final EFA results were reached, which produced a five-factor solution without any cross-loading and explained the 70.39% of the total variance (see Table 4.7. and Table 4.8.).

Table 4.6. Factor Loadings of the T-TPQ Items – First EFA

No	Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1	Leadership6	.879					
2	Leadership3	.855					
3	Lleadership1	.852					
4	Leadership2	.842					
5	Leadership5	.838					
6	Leadership4	.783					
7	Leadership7	.769					
8	Communication1		.819				
9	Communication2		.815				
10	Communication5		.777				
11	Communication6		.737				
12	Communication3		.698				
13	Communication4		.685				
14	Communication7		.682				
15	M_support6		.413			.410	
16	T_structure3			.775			
17	T_structure2			.757			
18	T_structure6			.739			
19	T_structure5			.733			
20	T_structure4			.644			
21	T_structure7			.628			
22	T_structure1			.586		.402	
23	S_monitoring3				.719		
24	S_monitoring2				.703		
25	S_monitoring1				.681		
26	S_monitoring4				.591		
27	S_monitoring6				.537		
28	S_monitoring5				.497		
29	M_support2					.738	
30	M_support1					.726	
31	M_support3					.720	
32	M_support4					.594	
33	M_support5						.684
34	M_support7						.543
35	S_monitoring7				.442		.538

Table 4.7. Eigenvalues and Percentages of Variance Explained – Final EFA

Factors	Eigenvalues	Rate of Variance Explained	Total Rate of Variance Explained
1	12.141	41.866	41.866
2	3.289	11.341	53.207
3	2.026	6.985	60.192
4	1.800	6.205	66.398
5	1.158	3.992	70.389

The factor loadings of the final EFA, which are shown in Table 4.8, indicated that the five-factor structure with 35 items of the original version of the T-TPQ was obtained in the Turkish context with 29 items. As can be observed from Table 4.8., all the seven items of leadership was loaded on Factor 1, thus representing the dimension of the leadership. Similarly, all the seven items related to communication were listed under Factor 2. Factor 3 composed of six items related to team structure and represented the dimension of team structure. Factor 4 represented the dimension of mutual support with five items. Lastly, four items of the dimension of situation monitoring were loaded on Factor 5. In sum, the EFA generated a five-factor structure with 29 items for the Turkish version of the T-TPQ. This factor structure and its reliability and validity; however, still need to be confirmed through CFA, as carried out below.

Table 4.8. Final Factor Loadings of the T-TPQ Items – Final EFA

No	Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1	Leadership6	.881				
2	Leadership3	.860				
3	Leadership1	.853				
4	Leadership2	.842				
5	Leadership5	.836				
6	Leadership4	.786				
7	Leadership7	.779				
8	Communication2		.834			
9	Communication5		.793			
10	Communication1		.793			
11	Communication6		.732			
12	Communication7		.726			
13	Communication4		.714			
14	Communication3		.711			
15	T_structure6			.771		
16	T_structure5			.754		
17	T_structure3			.741		
18	T_structure2			.728		
19	T_structure7			.692		
20	T_structure4			.654		
21	M_support1				.798	
22	M_support2				.764	
23	M_support3				.658	
24	M_support4				.614	
25	M_support5				.426	
26	S_monitoring2					.755
27	S_monitoring3					.743
28	S_monitoring1					.706
29	S_monitoring4					.515

The descriptive statistics, Cronbach's alpha values, and inter-item correlations are calculated for the 29 items of the T-TPQ items and its subdimensions, which were extracted through EFA. The results are presented in Table 4.9. The mean scores for individual items ranged from 2.82 (i.e., 'My supervisor/manager provides opportunities to discuss the unit's performance after an event.') to 3.95 (i.e., 'Information regarding

patient care is explained to patients and their families in lay term.'). When comparing the teamwork dimensions, the highest mean score was 3.76 (i.e., communication) and the lowest one was 2.94 (i.e., leadership). The internal consistency was analyzed by Cronbach's alpha and item-total correlations. Cronbach's alpha coefficients for each subscale (i.e., for each teamwork dimension) and for the entire scale were higher than acceptable cutoff (> 0.70), ranging from 0.84 to 0.95. The reliability coefficient of the entire scale was computed as Cronbach's $\alpha = 0.96$. Moreover, the item-total correlations varied from 0.42 to 0.69, indicating all items were correlated higher than 0.30 (Nunnally, 1978). The following part presents the results of the second Confirmatory factor analysis conducted in this study.

Table 4.9. Mean Scores, Standard Deviations, Cronbach's Alpha Coefficients and Item-Total Correlations for the T-TPQ (n = 238)

Item No	Item	Mean	(SD)	Cronbach's Alpha	Corrected Item-Total Correlation
	Entire Scale	**3.46**		**0.949**	
	Team Structure	**3.61**	**0.97**	**0.890**	
2	Staff are held accountable for their actions.	3.67	0.94		.533
3	Staff within my unit share information that enables timely decision making by the direct patient care team.	3.63	0.90		.562
4	Staff within my unit share information that enables timely decision making by the direct patient care team.	3.56	0.99		.695
5	Staff understand their roles and responsibilities.	3.60	0.99		.652
6	My unit has clearly articulated goals.	3.57	1.01		.539
7	My unit operates at a high level of efficiency.	3.64	0.99		.563
	Leadership	**2.94**	**1.14**	**0.951**	
8	My supervisor/manager considers staff input when making decisions about patient care.	2.94	1.19		.628
9	My supervisor/manager provides opportunities to discuss the unit's performance after an event.	2.82	1.17		.625
10	My supervisor/manager takes time to meet with staff to develop a plan for patient care.	2.90	1.14		.691

11	My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available.	3.07	1.16		.687
12	My supervisor/manager resolves conflicts successfully.	2.87	1.16		.612
13	My supervisor/manager models appropriate team behavior.	2.93	1.11		.657
14	My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care.	3.07	1.08		.674
	Situation Monitoring	**3.52**	**0.94**	**0.854**	
15	Staff effectively anticipate each other's needs.	3.37	1.01		.635
16	Staff monitor each other's performance.	3.59	0.89		.536
17	Staff exchange relevant information as it becomes available.	3.72	0.83		.601
18	Staff continuously scan the environment for important information.	3.40	1.02		.694
	Mutual Support	**3.54**	**0.94**	**0.842**	
22	Staff assist fellow staff during high workload.	3.51	1.01		.626
23	Staff request assistance from fellow staff when they feel overwhelmed.	3.53	0.99		.612
24	Staff caution each other about potentially dangerous situations.	3.86	0.84		.561
25	Feedback between staff is delivered in a way that promotes positive interactions and future change.	3.54	0.90		.684
26	Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit.	3.27	0.97		.422
	Communication	**3.76**	**0.89**	**0.916**	
29	Information regarding patient care is explained to patients and their families in lay term.	3.95	0.90		.580
30	Staff relay relevant information in a timely manner.	3.86	0.86		.655
31	When communicating with patients, staff allow enough time for questions.	3.60	0.98		.675
32	Staff use common terminology when communicating with each other.	3.71	0.93		.504
33	Staff verbally verify information that they receive from one another.	3.86	0.80		.629
34	Staff follow a standardized method of sharing information when handing off patients.	3.74	0.85		.531
35	Staff seek information from all available sources.	3.61	0.93		.651

4.2.3. Confirming the Five-Factor Structure Produced by EFA – Second CFA

In order to verify the model generated through EFA, there was a need for carrying out CFA for the second time. As in the first CFA, which was conducted in Part 4.2.1., the five-factor structure was tested in AMOS and the same model fit indices, such as the relative chi-square, RMSEA, SRMR, TLI and CFI, were generated.

The results of the initial model of the second CFA showed that a better fit with the data can be obtained (x2 (df) 931.26 (367), $p < 0.001$, RMSEA = 0.081, SRMR = 0.0601, TLI = 0.890, CFI = 0.879). For this reason, just as previously carried out in Part 4.2.1., the modification indices were examined in order to detect possible enhancements in the model fit. Four pairs of error terms, presented in Table 4.10., that had the highest modification indices and under the same subscales were correlated in order to improve model fit indices. Again, the rationale was that these modification indices were between the error terms of the items measuring the same construct and were likely to correlate each other (Keebler et al., 2014).

Table 4.10. Modification Indices for Initial Model- Second CFA

Error terms	Items	Modification Indices between error terms
e2	Staff are held accountable for their actions.	53.331
e3	Staff within my unit share information that enables timely decision making by the direct patient care team.	
e6	My unit has clearly articulated goals.	30.812
e7	My unit operates at a high level of efficiency.	
e8	Staff assist fellow staff during high workload.	27.113
e9	Staff request assistance from fellow staff when they feel overwhelmed.	
e12	My supervisor/manager resolves conflicts successfully.	54.487
e13	My supervisor/manager models appropriate team behavior.	

After correlating the error terms with high modification indices, the final model of the the second CFA was reached with the following goodness-of-fit statistics: x2 (df) 745.14 (363), $p < 0.001$, RMSEA = 0.067, SRMR = 0.0562, TLI = 0.917, CFI = 0.926). As can be seen from Table 4.11., these values provide evidence of acceptable model fit with regard to each fit statistics used.

Table 4.11. The Goodness of Fit Indices for Final Model – Second CFA

	Good Fit	Acceptable Fit	First Model	Final Model
CMIN			931.26	745.14
df			367	363
CMIN/*df*	< 3	< 5	2.537	2.053
RMSEA	< 0.05	< 0.08	0.081	0.067
SRMR	< 0.05	< 0.08	0.060	0.0562
CFI	> 0.95	> 0.90	0.890	0.926
TLI	> 0.95	> 0.90	0.879	0.917

(1) RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker-Lewis index; CFI, comparative fit index

The average variance extracted (AVE) scores and interscale correlations were calculated once again with 29 items in order to test convergent validity and discriminant validity of the refined scale obtained through EFA. As reported in Table 4.12., the average variance extracted values of all subdimensions were above the cutoff value 0.50, ranging from 0.55 (i.e., team structure) to 0.723 (i.e., leadership). Similarly, all correlations between teamwork dimensions were below than the square root of AVE values of correlated subdimensions. Interscale correlations ranged from 0.436 (i.e., leadership and communication) to 0.739 (i.e., mutual support and situation monitoring).

Table 4.12. The AVE Values, The Square root of AVE, and Interscale Correlations- Second CFA

Subscales	AVE	Square root of AVE	Leadership	Situation Monitoring	Mutual Support	Communication
Team Structure	0.550*	0.742	0.500**	0.706**	0.595**	0.627**
Leadership	0.723*	0.850	1	0.558**	0.525**	0.436**
Situation Monitoring	0.579*	0.761		1	0.739**	0.631**
Mutual Support	0.552*	0.743			1	0.596**
Communication	0.619*	0.787				1

(1) *AVE values > 0.5.

(2) ** Correlations lower than the square root of AVE values.

The reliability was also assessed using composite reliability (CR). As can be seen from Table 4.13., composite reliability scores ranged from 0.862 (i.e, situation monitoring) to 0.934 (i.e., communication), substantially higher than the required cutoff (> .70). The following chapter was devoted to discussing the results of this study.

Table 4.13. Composite Reliability Coefficients

Teamwork Dimensions	Team Structure	Leadership	Situation Monitoring	Mutual Support	Communication
Composite Reliability Values	0.887	0.933	0.862	0.870	0.934

CHAPTER 5

5. DISCUSSION AND CONCLUSION

This chapter consists of four parts. The first and second parts provide, respectively, theoretical and practical implications of the current study. The third part states some limitations of the current study and highlights some future research avenues. Finally, the fourth part concludes the study.

5.1. THEORETICAL IMPLICATIONS

The provision of healthcare services has become a multidisciplinary area in the modern world, requiring all allied health professionals with different specialities to work together in a team setting (Weller, Boyd, & Cumin, 2014). In this context, effective teamwork and communication have been regarded as the two core competencies for modern healthcare organizations. The role of teamwork has been investigated in several healthcare settings. Numerous measurement tools have been developed to examine the level of teamwork. TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) is one of these tools. T-TPQ is a 35-item scale and consists of five sub-dimensions, each of which has seven items.

The five-factor structure of the T-TPQ has been tested and confirmed in at least five countries (i.e., the USA, South Korea, Norway, Greece and Sweden). These efforts demonstrated that the questionnaire is a well-structured and cross-culturally validated measure for assessing the teamwork perceptions of health professionals. In the Turkish context, there was a lack of measurement tools for the assessment of teamwork perceptions of healthcare professionals. This thesis attempted to fill this gap by adapting the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) to the Turkish context.

A six-step procedure was employed to translate and adapt the questionnaire into Turkish. The scale was translated into the target language (Turkish) by using the forward and backward translation method (Brislin, 1970, 1976). The content validity was verified

by bilingual experts. A pilot test was conducted with health caregivers to evaluate the appropriateness of the questionnaire items (35 items) in the Turkish version.

A number of statistical analyses; namely, CFA, EFA, Cronbach's alpha, composite reliability, AVE and the square root of AVE calculations, were conducted on the Turkish version of the T-TPQ scale in order to examine its validity and reliability. As detailed below, the results indicated that, not the 35-item of the Turkish version of the scale, but its 29-item version is a reliable and valid measurement tool in the healthcare context in Turkey.

More specifically, the initial results obtained from Cronbach's alpha value calculations and the CFA conducted on the 35-item Turkish version indicated that the original Turkish version of the scale (with 35 items) were reliable but not valid. In particular, the model fit indices of the CFA showed moderate or acceptable fit with the data (see Table 4.3.). However, since the results of the convergent and discriminant validity tests were not desirable, the need for refining the scale emerged. For this reason, EFA was performed on the 35-item Turkish version of the scale. Based on the EFA results, six items were removed from the scale due to cross-loadings on multiple factors. Three of these items were under the dimension of 'situation monitoring', two of them were the items of 'mutual support' and one of them was the item of 'team structure'. These items are presented in Table 5.1.

Table 5.1. Questionnaire Items Removed

Item No	Label	Item
1	Team structure1	The skills of staff overlap sufficiently so that work can be shared when necessary.
19	Situation monitoring5	Staff share information regarding potential complications (e.g., patient changes, bed availability).
20	Situation monitoring6	Staff meets to reevaluate patient care goals when aspects of the situation have changed.
21	Situation monitoring7	Staff correct each other's mistakes to ensure that procedures are followed properly.
27	Mutual support6	When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard.
28	Mutual support7	Staff resolve their conflicts, even when the conflicts have become personal.

When examined the contents of these items, it was seen that five of these six items were somewhat related to information sharing or backup behaviors of staff or communication among team members. For example, the item number 19 is both associated with information sharing and situation monitoring. Similarly, the item number 21 aims for measuring if personnel communicate with other team members to warn them when necessary. The statement in the item number 27 is also concerning with the issue of communication and information sharing behavior of health team staff. The items number 28 and number 20 are partially related to communication among healthcare teams. Therefore, it is reasonable that these items might correlate with each other and with the items of communication factor, limiting respondents' ability to differentiate them. Lastly, the statement "work can be shared" in the item number 1 also points out a backup behavior of team staff. As can be seen from Table 4.6., this item cross-loaded on the dimensions of both team structure and mutual support. In sum, the result of EFA with principal component analysis extracted five factors with 29 items and each of these factors corresponded to its subdimension, just as it does in the original (English) version of the T-TPQ.

The second CFA was performed on the five-factor model with 29 items obtained through EFA. The results of this second CFA indicated that the five-factor model with 29 items fits the data better than the five-factor model with 35 items and represents an acceptable, almost good fit (see Table 4.11.). The relative chi-square (x^2/df) was equal to 2.053, which was highly satisfactory for the model fit. This result was better than the value of the Swedish version (x^2/df = 2.25) (Hall-Lord et al., 2020) and was almost identical with the value of the Greek version (x^2/df = 2.05) (Lakatamitou et al., 2020). The relative chi-square indicator of the Norwegian version (x^2/df = 1.76) was the best among these studies (Ballangrud et al., 2017). The study of Keebler et al. (2014) indicated a higher value of relative chi-square (x^2/df = 6.59), which can be attributed to the large sample size (N = 1700). The value of SRMR in the current study was very close to the cutoff value of <0.5 (0.0562), indicating an acceptable model fit. Other studies did not submit the SRMR value, except for the study of Hwang and Ahn (2015) (SRMR = 0.053). In the present study, the RMSEA value was 0.067, which was less than the expected cutoff (0.08). This result suggested an adequate model fit between the empirical data and the theoretical model proposed. Previous works presented (slightly) better values of

RMSEA, ranging from 0.055 to 0.067. Lastly, CFI and TLI values obtained in this study were higher than the expected cutoff (> .90) (CFI = 0.926; TLI = 0.917), indicating acceptable fit for the model. In the other five studies, the values of CFI and TLI varied from 0.87 to 0.99.

In sum, the CFA goodness-of-fit indices indicated that the five-dimensional factor structure of the T-TPQ's Turkish version (with 29 items, as shown in Appendix 5) was the same with that of the original version (with 35 items). In addition, it was seen that the construct validity (i.e., convergent and discriminant validity) scores produced in this study were consistent with, or comparable to, the results of the previous studies. Findings of the CFA suggested that the Turkish version of the questionnaire had good construct validity.

As it was stated previously, the author of the present study aimed to establish the validity of the Turkish version of the T-TPQ by providing evidence of convergent and discriminant validity. The results of the analyses indicated, as can be seen from Table 4.12., that the average variance explained (AVE) values for all subdimensions were higher than the expected cutoff value (> .5), providing evidence of convergent validity. This result demonstrated that subscales of the T-TPQ were sufficiently correlated with each other. On the other hand, discriminant validity was established by comparing the square root of AVE values and interscale correlation coefficients. As can be seen in Table 4.12., all the square root of AVE values of each construct were higher than all of the correlation values of subdimensions. This means that subscales of the T-TPQ sufficiently discriminated from each other, which establish discriminant validity for the Turkish version of the T-TPQ. Previous studies testing the psychometric properties of the T-TPQ (i.e., Keebler et al., 2014; Ballangrud et al., 2017; Hall-Lord et al., 2020) examined only the correlations of subscale means in order to test interdependence of subdimensions. The procedure used in this study is a more robust way of evaluating the properties of the scale. Therefore, it is possible to say that the psychometric properties of the Turkish version of the T-TPQ were investigated more profoundly compared to the other studies that previously adapted the scale to different countries.

In this study, the reliability of the scale was determined using both Cronbach's alpha coefficients and composite reliabilities (CR), which was not employed in previous studies (i.e., Ballangrud et al., 2017; Hall-Lord et al., 2020; Hwang & Ahn, 2015; Keebler

et al., 2014, Lakatamitou et al., 2020). Previous studies showed that the T-TPQ was a highly reliable measure for the assessment of the teamwork perceptions of health staff. Similarly, in the present study, Cronbach's alpha coefficients indicated a high level of internal consistency for the entire scale and for each subdimension. In the same vein, composite reliability scores for the T-TPQ subdimensions were notably satisfactory regarding the reliability of the scale (see Table 4.13). Therefore, the reliability analyses conducted in the current study showed that the Turkish version of the T-TPQ is a highly reliable measurement tool, as in the other versions employed in various countries (see Table 2.3.).

To sum up, this present study was conducted to determine whether the psychometric properties of the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) were satisfactory in the Turkish context. The questionnaire showed a high level of internal consistency, which was consistent with the original scale and other versions translated into various languages. The values of CFA model fit indices also indicated that the Turkish version of the scale, which contained 29 items, had construct validity. In fact, the goodness-of-fit indices produced by CFA were comparable to those of other versions and they met the expected cutoffs.

When compared to the T-TPQ's psychometric properties reported in other studies in Table 4.2. (e.g., Keebler et. al., 2014), one can conclude that the Turkish version produced (slightly) lower values with regard to some fit indices. This might be due to several reasons. First, the context of the questionnaire where it was originally developed was the American context, where the proportion of the public institutions in the provision of the healthcare services is much higher than the Turkish context. For example, the item number 26 in the Table 4.9. generated confusion at first. The experts and practitioners were consulted to comprehend the true meaning of the item and what it aimed to measure. As it was mentioned in the scale adaptation procedure (see Part 3.3.), one of the physicians interviewed, working in a privately-owned hospital, explained the possible circumstances in which a health caregiver may be in conflict with his/her manager regarding the interest of patients. He mentioned about the conflict of interest between hospitals and patients, stating that some of the privately-owned institutions might prioritize financial expectations and impose health professionals to do unnecessary interventions (e.g., to offer unnecessary operation to patient). This feedback was useful

to detect the cultural and practical differences between the contexts. Second, a large variety of sample might be a cause for relatively worse values on indicators. For example, Yardımcı et al. (2012) translated the Teamwork Attitudes Questionnaire (T-TAQ) with the data collected from a total of 150 respondents involving only physicians and nurses. In this study, the sample consisted of 238 healthcare professionals working in four hospitals located in two different cities. Also, the sample composed of respondents with six different occupations (i.e., physicians, nurses, midwives, health technicians, physiotherapists and dieticians). Such diversity might also have affected the results. Finally, the data collected from a certain unit, such as the emergency department, intensive care or obstetric care may generate more precise values on model fit indices.

In sum, the Turkish version of the T-TPQ has the same subdimensions (i.e., team structure, leadership, situation monitoring, mutual support, and communication) as the original (English) version. However, while the original version has a total of 35 items, the validated Turkish version has 29 items. Therefore, the 29-item Turkish version of T-TPQ (see Appendix 5) is an acceptable tool for the assessment of perceptions of health staff toward teamwork in the Turkish context.

5.2. PRACTICAL IMPLICATIONS

The results of the descriptive analysis conducted in this study demonstrated that the mean score of the dimension of leadership was the lowest among teamwork dimensions. This finding was consistent with the previous studies in which mean scores of the dimension of leadership were the lowest among teamwork dimensions (Ballangrud et al., 2017; Hall-Lord et al., 2020; Hwang & Ahn, 2015). This might be an implication for practitioners that team leadership, as a vital component of effective teamwork, should be improved in order to enhance team performance and thus delivery of care. More specifically, the mean scores of two items in Table 4.9., namely item number 11 and item number 14 were relatively higher than those of other leadership items (see Table 4.9.). When considering the content of these items, it is possible to say that these statements were more related to control-oriented behaviors of team leaders. On the other hand, the lowest score items; namely item number 9 and item number 10 were about the behaviors of team leader toward employee participation. The fact that these two items had the lowest

scores may indicate that team leaders in the sample were more tended to adopt the directive leadership style rather than participative leadership, which might result in the low mean scores for the leadership dimension.

Scanning behavior is one of the important functions of the managerial decision-making process (Elenkov, 1997). Managers of healthcare organizations should be aware of the performance of each division, need to identify disruptions and inefficiencies in the delivery of services and take the right actions for positive outcomes for the future. Team training interventions, such as TeamSTEPPS, are one of the options to enhance team performance. Implementation of TeamSTEPPS team training program has been evidenced to improve patient outcomes (Riley et al., 2011), employee outcomes (Harvey et al., 2014) and other various relevant indicators. Considering the fact that the performance indicators of the health system in Turkey are below the required levels and OECD averages (Daştan & Çetinkaya, 2015), such team training programs should be evaluated as an option for improving the delivery of care. In this context, for practitioners, the T-TPQ can be used in hospital settings to detect teamwork performance, allowing to determine whether a team training program is needed or where it is needed.

5.3. LIMITATIONS AND FUTURE RESEARCH

The study has some limitations, which also opens the way for future research. First, even though the sample size of this study (238) met the recommended 5 to 1 ratio of subjects to items (Bryant & Yarnold, 1995), this sample size was the lowest among the studies in Table 2.3., which tested the validity and reliability of the T-TPQ in other countries. Therefore, replicating this study with larger samples from Turkey is desirable to further establish the validity of the T-TPQ scale in the Turkish context.

Second and in the same vein, the study utilized convenience sampling, a type of non-probability sampling method, to obtain data from healthcare. This sampling method is not favourable compared to random sampling in terms of generalizability of the results. However, convenience sampling was adopted in this study due to its flexibility and being cost-efficient. Future research might replicate this study with the data collected by means of random sampling to increase our confidence in the generalizability of the findings of this study.

Third, this study did not focus on a specific clinical setting. Future studies might investigate, compare and contrast the teamwork perceptions of healthcare professionals working in different settings, such as palliative care (Goebel, Guo, & Wood, 2016), emergency department (Obenrader, Broome, Yap, & Jamison, 2019) or operating room (Dahl et al., 2019).

Finally, future studies in the Turkish context are needed to provide empirical evidence in relation to using T-TPQ as a team intervention or team training tool to determine the effectiveness of the TeamSTEPPS program. Studies, such as the ones by Gaston et al. (2016) and Obenrader et al. (2019), can be useful for this purpose.

5.4. CONCLUSION

This study was conducted to determine the psychometric properties of the Turkish version of the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ). The results demonstrated that the 29-item Turkish translated version of the T-TPQ was a reliable and valid measurement tool. The study contributed to the existing body of knowledge by proposing a measure that can be employed in the healthcare context in Turkey. It provided a self-report tool for measuring teamwork performance so that empirical studies investigating the various variables on team performance can be conducted in the Turkish context. In addition, the questionnaire can be used in a pre-and post-design to determine the effectiveness of the team training programs. Further, cross-cultural comparisons can be conducted to see if the factor structure and validity of the T-TPQ holds across different cultures.

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APPENDICES

Appendix 1: The Original Version of the TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ)

Team Structure	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. The skills of staff overlap sufficiently so that work can be shared when necessary.					
2. Staff are held accountable for their actions.					
3. Staff within my unit share information that enables timely decision making by the direct patient care team.					
4. My unit makes efficient use of resources (e.g., staff supplies, equipment, information).					
5. Staff understand their roles and responsibilities.					
6. My unit has clearly articulated goals.					
7. My unit operates at a high level of efficiency.					
Leadership	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
8. My supervisor/manager considers staff input when making decisions about patient care.					
9. My supervisor/manager provides opportunities to discuss the unit's performance after an event.					
10. My supervisor/manager takes time to meet with staff to develop a plan for patient care.					

11. My supervisor/manager ensures that adequate resources (e.g., staff, supplies, equipment, information) are available.					
12. My supervisor/manager resolves conflicts successfully.					
13. My supervisor/manager models appropriate team behavior.					
14. My supervisor/manager ensures that staff are aware of any situations or changes that may affect patient care.					
Situation Monitoring	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
15. Staff effectively anticipate each other's needs.					
16. Staff monitor each other's performance.					
17. Staff exchange relevant information as it becomes available.					
18. Staff continuously scan the environment for important information.					
19. Staff share information regarding potential complications (e.g., patient changes, bed availability).					
20. Staff meets to reevaluate patient care goals when aspects of the situation have changed.					
21. Staff correct each other's mistakes to ensure that procedures are followed properly.					
Mutual Support	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
22. Staff assist fellow staff during high workload.					
23. Staff request assistance from fellow staff when they feel overwhelmed.					
24. Staff caution each other about potentially dangerous situations.					

25. Feedback between staff is delivered in a way that promotes positive interactions and future change.					
26. Staff advocate for patients even when their opinion conflicts with that of a senior member of the unit.					
27. When staff have a concern about patient safety, they challenge others until they are sure the concern has been heard.					
28. Staff resolve their conflicts, even when the conflicts have become personal.					
Communication	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
29. Information regarding patient care is explained to patients and their families in lay terms.					
30. Staff relay relevant information in a timely manner.					
31. When communicating with patients, staff allow enough time for questions.					
32. Staff use common terminology when communicating with each other.					
33. Staff verbally verify information that they receive from one another.					
34. Staff follow a standardized method of sharing information when handing off patients.					
35. Staff seek information from all available sources.					

Appendix 2: The Permission Obtained from the Agency for Health Research and Quality

From: Lewin, David (AHRQ/OC) <David.Lewin@ahrq.hhs.gov>
Sent: Wednesday, July 1, 2020 6:39 PM
To: mustafa.colak@asbu.edu.tr
Cc: Siegel, Randie A. (AHRQ/OC) <Randie.Siegel@ahrq.hhs.gov>; Haugstetter, Monika (AHRQ/CQuIPS) <Monika.Haugstetter@ahrq.hhs.gov>
Subject: RE: Permission to use TeamSTEPPS Questionnaire

Dear Mustapha,

Thank you for responding promptly to my request for clarification. Sometimes I receive a request to use something in English from a country where I would have expected a request for translation (for example, Saudi Arabia), so I needed to be sure.

This email constitutes permission from the Agency for Healthcare Research and Quality (AHRQ) to your graduate student, Cagatay Yilmaz, to translate the TeamSTEPPS® 2.0 Teamwork Perceptions Questionnaire (T-TPQ) into Turkish and evaluate its validity and reliability in a Turkish population. We understand that this will be part of the work for his Master's Dissertation from the Social Sciences University of Ankara. He may reprint the English-language version in his dissertation, but would require additional permission from the AHRQ Office of Communications to reprint the English-language version in a professional journal article or book chapter. The Turkish translation can be shared with other researchers and medical centers in Turkey on a noncommercial basis.

The suggested reference citation for the tool si:

> "Teamwork Perceptions Questionnaire (T-TPQ) & Manual." Team Strategies & Tools to Enhance Performance & Patient Safety (TeamSTEPPS®) 2.0. Agency for Healthcare Research and Quality; Rockville, Maryland USA. March 2014. https://www.ahrq.gov/teamstepps/instructor/tools.html

Please feel free to contact me if you have any questions about this permission.

Sincerely,

David I. Lewin, M.Phil.
Health Communications Specialist/Manager of Copyrights & Permissions
Office of Communications
Agency for Healthcare Research and Quality
5600 Fishers Lane
Room # 07N58D / Mail Stop # 07N94A
Rockville, MD 20857 USA

Appendix 3: The Ethics Committee Approval

Evrak Tarih ve Sayısı: 25/08/2020-7049

T.C.
ABDULLAH GÜL ÜNİVERSİTESİ REKTÖRLĞÜ
Etik Kurul

Sayı : 23934413-044-7049 25/08/2020
Konu : Anketler

Sayın Ar.Gör. Çağatay YILMAZ

Üniversitemiz Etik Kurulunun 14.08.2020 tarihinde yapmış olduğu toplantıda anket izin başvurunuz uygun bulunmuş olup, ilgili onay belgesi yazımız ekinde gönderilmiştir.
Bilgilerinize rica ederim

e-imzalıdır
Prof.Dr. İrfan ALAN
Rektör Yardımcısı

Ek: Cagatay YILMAZ_EtikKurulOnayFormu_301104 (1 sayfa)

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Unvanı: Fakülte Sekreteri

Evrak Tarih ve Sayısı: 21/08/2020-6913

ABDULLAH GÜL ÜNİVERSİTESİ ETİK KURULU PROJE/ANKET ONAY FORMU

Proje Adı	Ekip Çalışması Algıları Ölçeğinin Türkiye Bağlamında Geçerlilik ve Güvenilirlik Analizi
Projenin Niteliği	Bireysel araştırma projesi
Projenin Araştırmacıları	Arş. Gör. Çağatay Yılmaz

KARAR:

Proje/Anket sonucu elde edilen çıktıların kullanımında Üniversitenin adı ya da üniversitenin kurumsal kimliğinin açıkça ortaya çıkmasına yol açabilecek şehir ölçek vb. belirleyici özellikler kullanılmamak şartıyla Proje/Anket etik açıdan uygun bulunmuştur. [X]

Projenin etik açıdan geliştirilmesi gerekmektedir. [ ]

Proje etik açıdan uygun değildir. [ ]

14 /08/2020

ADI SOYADI	**İMZA**
Prof. Dr. İrfan ALAN (Başkan)	e-imzalıdır
Prof. Dr. Rasim Özgür DÖNMEZ	e-imzalıdır
Prof. Dr. Hakan USTA	e-imzalıdır
Prof. Dr. Alper UĞRAŞ	e-imzalıdır
Doç. Dr. Eyüp DOĞAN	e-imzalıdır
Dr. Öğr. Üyesi O. İsmail KAPLAN	e-imzalıdır
Fikri ULUSOY	e-imzalıdır

Bu belge 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.

Appendix 4: The Final Translated (Turkish) Version of the T-TPQ

Ekip Yapısı	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
1. Çalıştığım birimdeki personelin becerileri o kadar uyumludur ki yapılan işler gerektiğinde paylaşılabilir.					
2. Çalıştığım birimdeki personel, eylemlerinden sorumlu tutulur.					
3. Çalıştığım birimdeki personel, hasta bakım ekibinin zamanında karar vermesini mümkün kılan bilgileri paylaşır.					
4. Çalıştığım birim, kaynakları (personel, malzeme, ekipman, bilgi vb.) verimli bir şekilde kullanır.					
5. Çalıştığım birimdeki personel rollerini ve sorumluluklarını bilir.					
6. Çalıştığım birimin açıkça belirtilmiş hedefleri mevcuttur.					
7. Çalıştığım birim, yüksek verimlilikte çalışmaktadır.					
Liderlik	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
8. Yöneticim/amirim, hasta bakımı ile ilgili kararlar verirken personelin görüşlerini dikkate alır.					
9. Yöneticim/amirim, bir vakadan sonra birimimizin performansını ortaklaşa değerlendirme fırsatı sunar.					
10. Yöneticim/amirim, hasta bakımı ile ilgili bir plan yapmak için personel ile görüşmeye zaman ayırır.					
11. Yöneticim/amirim, kaynakların (personel, malzeme, ekipman, bilgi vb.) yeterli düzeyde mevcut olduğundan emin olur.					
12. Yöneticim/amirim, iş yerindeki anlaşmazlıkları başarıyla çözer.					
13. Yöneticim/amirim, uygun takım davranışını biçimlendirir.					
14. Yöneticim/amirim, hasta bakımını etkileyebilecek durumlardan veya değişikliklerden personelin haberdar olduğundan emin olur.					
Durum İzleme	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
15. Çalıştığım birimdeki personel, birbirlerinin ihtiyaçlarını tahmin etmede başarılıdır.					
16. Çalıştığım birimdeki personel, birbirlerinin performansı hakkında bilgi sahibidirler.					
17. Çalıştığım birimdeki personel, işleri/hastaları ile ilgili yeni bir bilgi ortaya çıktığında ilgili/sorumlu birim ya da kişilerle bilgi alışverişinde bulunur.					
18. Çalıştığım birimdeki personel önemli bilgiler için çevreyi sürekli olarak inceler.					
19. Çalıştığım birimdeki personel, olası komplikasyonlar ile ilgili bilgileri (hasta değişiklikleri, yatak bulunabilirliği vb.) ilgili kişi veya birimlerle paylaşır.					
20. Çalıştığım birimdeki personel, şartlar/durumun boyutları değiştiğinde hasta bakım ile ilgili amaçlarını yeniden değerlendirmek için toplanır.					
21. Çalıştığım birimdeki personel, prosedürlerin doğru bir şekilde takip edildiğinden emin olmak için birbirlerinin hatalarını düzeltir.					

Karşılıklı Destek	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle katılıyorum
22. Çalıştığım birimdeki personel, iş yükü çok olduğunda birlikte mesai yaptığı personele yardımcı olur.					
23. Çalıştığım birimdeki personel, aşırı bunalmış hissettiğinde birlikte mesai yaptığı personelden yardım ister.					
24. Çalıştığım birimdeki personel, olası tehlikeli durumlar ile ilgili birbirlerini uyarır.					
25. Çalıştığım birimdeki personel arasındaki geri bildirim, olumlu etkileşimleri ve gelecekteki değişimi destekleyecek bir şekilde paylaşılır.					
26. Çalıştığım birimdeki personel, görüşleri yöneticisinin/amirinin görüşü ile çelişse bile hastadan yana tavır alır.					
27. Çalıştığım birimdeki personel, hasta güvenliği konusunda endişe duyduğunda, diğer personelin de durumdan haber olduğundan emin olana kadar çabalar.					
28. Çalıştığım birimdeki personel, anlaşmazlıkları kişiselleşmiş olsa bile, kendi aralarında çözer.					
İletişim	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
29. Hasta bakımı ile ilgili bilgiler hastalara ve hasta yakınlarına anlaşılır bir dille açıklanmaktadır.					
30. Çalıştığım birimdeki personel, işleri/hastaları ile ilgili bilgileri zamanında bildirir.					
31. Çalıştığım birimdeki personel, hastalarla iletişim kurarken, hastaların soruları için yeterli zaman tanır.					
32. Çalıştığım birimdeki personel, birbirleriyle iletişim kurarken ortak bir mesleki dil/terminoloji kullanır.					
33. Çalıştığım birimdeki personel, birbirlerinden aldıkları bilgileri sözlü olarak teyit eder.					
34. Çalıştığım birimdeki personel, hastaları diğer bir personele devrederken standart bir bilgi paylaşımı yöntemi takip eder.					
35. Çalıştığım birimdeki personel, mevcut tüm kaynaklardan bilgi edinmeye çalışır.					

Appendix 5: The Validated Turkish Version of the T-TPQ

Ekip Yapısı	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
1. Çalıştığım birimdeki personel, eylemlerinden sorumlu tutulur.					
2. Çalıştığım birimdeki personel, hasta bakım ekibinin zamanında karar vermesini mümkün kılan bilgileri paylaşır.					
3. Çalıştığım birim, kaynakları (personel, malzeme, ekipman, bilgi vb.) verimli bir şekilde kullanır.					
4. Çalıştığım birimdeki personel rollerini ve sorumluluklarını bilir.					
5. Çalıştığım birimin açıkça belirtilmiş hedefleri mevcuttur.					
6. Çalıştığım birim, yüksek verimlilikte çalışmaktadır.					
Liderlik	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
7. Yöneticim/amirim, hasta bakımı ile ilgili kararlar verirken personelin görüşlerini dikkate alır.					
8. Yöneticim/amirim, bir vakadan sonra birimimizin performansını ortaklaşa değerlendirme fırsatı sunar.					
9. Yöneticim/amirim, hasta bakımı ile ilgili bir plan yapmak için personel ile görüşmeye zaman ayırır.					
10. Yöneticim/amirim, kaynakların (personel, malzeme, ekipman, bilgi vb.) yeterli düzeyde mevcut olduğundan emin olur.					
11. Yöneticim/amirim, iş yerindeki anlaşmazlıkları başarıyla çözer.					
12. Yöneticim/amirim, uygun takım davranışını biçimlendirir.					
13. Yöneticim/amirim, hasta bakımını etkileyebilecek durumlardan veya değişikliklerden personelin haberdar olduğundan emin olur.					
Durum İzleme	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
14. Çalıştığım birimdeki personel, birbirlerinin ihtiyaçlarını tahmin etmede başarılıdır.					
15. Çalıştığım birimdeki personel, birbirlerinin performansı hakkında bilgi sahibidirler.					
16. Çalıştığım birimdeki personel, işleri/hastaları ile ilgili yeni bir bilgi ortaya çıktığında ilgili/sorumlu birim ya da kişilerle bilgi alışverişinde bulunur.					
17. Çalıştığım birimdeki personel önemli bilgiler için çevreyi sürekli olarak inceler.					
Karşılıklı Destek	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
18. Çalıştığım birimdeki personel, iş yükü çok olduğunda birlikte mesai yaptığı personele yardımcı olur.					
19. Çalıştığım birimdeki personel, aşırı bunalmış hissettiğinde birlikte mesai yaptığı personelden yardım ister.					
20. Çalıştığım birimdeki personel, olası tehlikeli durumlar ile ilgili birbirlerini uyarır.					
21. Çalıştığım birimdeki personel arasındaki geri bildirim, olumlu etkileşimleri ve gelecekteki değişimi destekleyecek bir şekilde paylaşılır.					

22. Çalıştığım birimdeki personel, görüşleri yöneticisinin/amirinin görüşü ile çelişse bile hastadan yana tavır alır.					
İletişim	**Kesinlikle katılmıyorum**	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlikle katılıyorum**
23. Hasta bakımı ile ilgili bilgiler hastalara ve hasta yakınlarına anlaşılır bir dille açıklanmaktadır.					
24. Çalıştığım birimdeki personel, işleri/hastaları ile ilgili bilgileri zamanında bildirir.					
25. Çalıştığım birimdeki personel, hastalarla iletişim kurarken, hastaların soruları için yeterli zaman tanır.					
26. Çalıştığım birimdeki personel, birbirleriyle iletişim kurarken ortak bir mesleki dil/terminoloji kullanır.					
27. Çalıştığım birimdeki personel, birbirlerinden aldıkları bilgileri sözlü olarak teyit eder.					
28. Çalıştığım birimdeki personel, hastaları diğer bir personele devrederken standart bir bilgi paylaşımı yöntemi takip eder.					
29. Çalıştığım birimdeki personel, mevcut tüm kaynaklardan bilgi edinmeye çalışır.					

CURRICULUM VITAE

Çağatay YILMAZ

Academic Position

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Social Sciences University of Ankara, GPA 3.94

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Academic Proficiency Test Scores

Academic Personnel and Postgraduate Education Entrance Exam (ALES): ***89,12***

Higher Education Institutions Foreign Language Exam (YOKDIL): ***93,75***

Foreign Language Proficiency Exam (YDS): ***83,75***

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